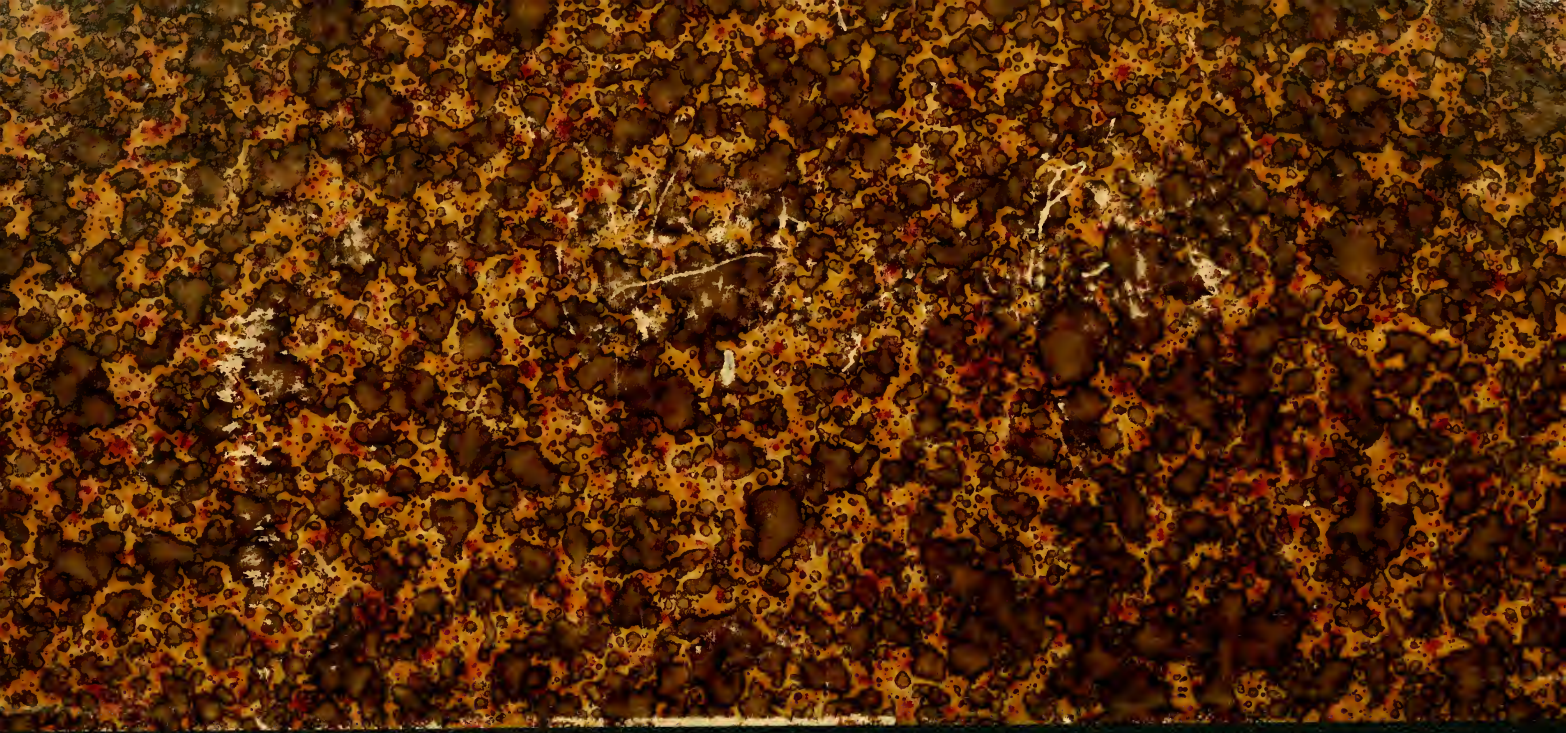

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OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XVII., Part I.

[With Two Plates.]

EDITED BY PROFESSOR RALPH TATE.

ISSUED JUNE, 1893.

Adelaide:

W. C. RIGBY, 74, KING WILLIAM STREET.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London.

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List of South Australian Rhopalocera.

By Oswald B. Lower, F.E.S.

[Read February 7, 1893.]

As some ten years have elapsed since the publication of Mr. Tepper's list of South Australian Rhopalocera (Trans. Roy. Soc. S.A., 1881), I have deemed it advisable to write the present paper, especially as the list has been considerably augmented by the addition of several interesting species hitherto unrecorded for this colony. It is usually considered, I believe, that the scarcity (?) of Rhopalocera in this colony is due to the great dryness during the season of flight; also the severe droughts we are subjected to, &c. But my honest conviction is that the scarcity is due to the want of systematic collecting. Unfortunately, we possess but very few energetic entomologists among our members, and until we have more workers must rest content with slow progress in this particular branch. It will be gratifying, however, to know that we have found several species new to the colony. In Tepper's list 27 species were said to occur here; in the present paper I am able to bring the total up to 40 species, chiefly through the diligent collecting of my two brothers—Messrs. Harold and Rupert Lower. I have excluded the doubtful species, a list of which will be found at the end of this paper. All the species have been taken within a radius of 30 miles of Adelaide, excepting the Port Lincoln species, and I have no doubt that when other districts are properly worked our list will be still further increased.

Papilio, *Linn.*

1. Pap. Erithonius, *Cram.*, var. Sthenelus, *McLeay.*

King's Survey Aust., II., p. 457, n. 133, 1827; *Tepp.*, Trans. Roy. Soc., S.A., for 1881.

Blackwood, Reedbeds, Macclesfield, in October and November; a scarce species; larvæ found at Brighton, feeding on *Psoralea adscendens*, in February.

Terias, *Swain.*

2. T. Smilax, *Don.*

Pap. S., Ins. N.H., t. 20, f. 3, 1805; *Tepp.*, Trans. Roy. Soc. S.A., for 1881.

Syn.—T. ingana, *Wall*, Tr. Ent. Soc., ser. iii.–iv., p. 332, n. 10, 1867; T. sinta, *Wall*, l.c., 1867.

Parkside, Belair, Blackwood, and Highbury, from November

to February. Most common in October, frequenting blossoms of Cape dandelion (*Cryptostemma calendulacea*), the colour of which agrees so well with the insects as to make it very difficult to discern them.

PIERIS, *Schr.*

3. P. TEUTONIA, *Fabr.*

Pap. T., Syst. Ent., p. 474, n. 137, 1775 ; *Tepp.*, Tr. Roy. Soc. S.A., for 1881.

Syn.—Pap. coronea, *Cram.*, Pap. Ex. 1, t. 68, B.C., 1779; female Pap. Deiopeia, *Don.*, Ins. N.H., t. 21, f. 2, 1805? P. Clytie, *Don.*, l.c., t. 19, f. 2, 1805 ; P. Niseia, *Macl.*, King's Surv. Aust., App. 459, n. 138, 1827.

Parkside, Blackwood, Waterfall Gully, &c.; also in the Botanic Gardens, Adelaide, frequenting *Capparis spinosa* in November, and again in March. On November 15, 1889, this species appeared in hundreds passing from south to north. The following day scarcely one was to be seen, nor have I observed them in such numbers since. Its proper food plant is *Capparis Mitchelli*, but we have reared specimens from the egg-stage by feeding with *C. spinosa*.

Egg.—Cylindrical, slightly narrowing at both ends, longitudinally grooved with 8 to 10 furrows. Colour, orange; after the larva emerge the shell becomes pearly white. The eggs are deposited on the underside of the terminal leaves in clusters of from 15 to 26. The imago deposits them at the rate of about 13 a minute, and when examined they resemble miniature ninepins. They hatch nine days after being laid. Length, $1\frac{1}{4}$ mm.

Young larvæ (on emergence).—Dull orange-yellow, head and anal segment fuscous. All the segments are furnished with long hairs, being longest on anterior segment. The young larva on exclusion begin to feed voraciously on the shell of the egg, afterwards on the leaf of food plant. Length, 3 mm.

After First Moult.—Head black, body light-brown, thickly studded with golden yellow spots and whitish hairs, giving the caterpillar a very pretty appearance. Length, 9 mm.

After Second Moult.—No perceptible difference excepting that the colour of body is more whitish, and has a somewhat polished appearance. Length, 18 to 22 mm.

Larvæ Full Grown.—Head shining black, minutely dusted with yellowish and covered with rather long, erect whitish hairs. Body shining dark-brown, with a darker dorsal streak, minutely sprinkled with short erect hairs. Second and third segments with a collar of moderate-sized golden yellow spots placed anteriorly. Fourth and fifth similar. All other segments have six golden spots about same size as preceding, only instead of

being in the form of a collar are placed triangularly. Three placed each side of dorsal streak, two anteriorly, and one posteriorly ; anal segment blackish, with collar of similar spots, but rather larger than preceding, a moderate greenish lateral stripe above spiracles. Spiracles golden yellow, rather prominent. Belly and sides rather thickly studded with long white hairs. Colour of abdomen greenish yellow.

Chrysalis.—Sordid ochreous-white, the colours of imago showing through the transparent skin, especially so in the male. Head case pointed and rugose. Thoracic region strongly elevated into a roughened ridge, bearing at the junction of abdomen two spines acutely produced. Abdomen sprinkled with blackish, and each segment has a pointed protuberance, and on each side of this two small, whitish shining tubercles. Sides broadly white. Spiracles dull yellowish. The chrysalis is held in position by a fine white ligament fastened to the stem of plant. Average length of chrysalis, 15 mm. ; width, about 4 mm. The imago emerges eight days after transformation. The colour agreeing very well with the white flowers of food-plant.

Delias, *Hub.*

4. D. Aganippe, *Don.*

Pap. A., Inst. N.H., t. 29, 1805 ; *Tepp.* (Pier. Ag.), Tr. Roy. Soc., S.A., for 1881.

Parkside, Blackwood, Petersburg, Fullarton, Teatree Gully, and Highbury, from September to January ; feeds on *Loranthus linophyllus;* most common during January at Highbury. Mr. R. Lower took a specimen at Unley in June.

The female of this species is figured in Tepper's paper as *Delias (Pieris) Harpalyce*, Don., although the median discal dot is not shown. The fig., however, does *not* represent "Harpalyce."

Callidryas, *Bdi.*

6. C. pyranthe, *Linn.*

Pap. P., Syst. Nat. 1, p. 469, n. 66, 1758.

Syn.—Pap. Chryseis, *Dru.*, Ill. Ex. Ent. 1, t. 12, f. 3, 4, 1773 ; Pap. Gnome, *Fab.*, Syst. Ent. App., p. 808, 1775 ; P. Gnoma, *Fab.*, Syst. Ent. App., p. 828, n. 152, 153, 1776 ; P. Alcyone, *Cram.*, Pap. Ex. I., t. 58, A.-C., 1779 ; P. flavocinerascens, *Goeze*, Ent. Beyt.. III. I, p. 183, n. 86, 1779 ; P. Phillipina, *Cram.*, Pap. Ex. IV., t. 361, C.D., 1782 ; P. nephte, *Fab.*, Syst. Ent. III., 1, p. 190, n. 588, 1793 ; P. Ilea, *Fab.*, l.c., Supp., p. 426, 1798 ; P. Minna, *Herbst.*, Nat. Schm., V., t. 89, fig. 1, 2, 1792 ; C. Thiserilla, *Bdv.* (nec *Wall*), sp. gen. I., p. 609, n. 3, 1836 ; C. Evangelina, *Butl.*, Tr. Ent. Soc., p. 11, n. 6, 1870.

I have seen a specimen of this insect, taken by Mr. E. Guest at Balhannah. It was hovering over apple blossoms when discovered. It is a fairly common Queensland species, but hitherto unrecorded for South Australia.

Danais, *Latr.*

6. D. petilia, *Stoll.*

Pap. p., Supp. *Cramer's* Pap. Ex., p. 132, t. 28., f. 3, 1787-91.

Parkside, Waterfall Gully (rather common), Mount Gawler, Blackwood, &c., from November to May. Most common during April, but never very abundant.

Tepper calls this *D. Chrysippus*, Linn., in his list, a widely different species, and not known to occur in Australia.

D. Erippus, *Cramer.*

Pap. E., Pap. Ex., I., t. 3, A.B., 1775 ; *Guest*, Tr. Roy. Soc. S.A., vol. VIII., p. 61, 1886.

Syn.—D. plexippus, *Linn.* (Papilio), Mus. Ulr. p. 262, 1764 ; D. Archippus, *Linn.* (Papilio), Syst. Nat. 1, 2, p. 767, 1767 ; D. Archippe, *Godt.*, Enc. Meth., IX., p. 184, n. 28, 1819 ; Anosia megalippe, *Hb.*, Samml. Ex. Schm., 1806-24.

Waterfall Gully and Brighton, two specimens. This species is now very plentiful at Waterfall Gully, frequenting its food-plant (*Gomphocarpus fruticosus*) during April and May. The larva is too well-known to need description, but I may state, so far as my experience goes, the bred specimens cannot compare with those caught on the wing for size or colour. The species is greatly subjected to the attacks of a parasitic dipter (the name of which I have been unable to find). It is our finest species, sometimes measuring $5\frac{1}{2}$ inches in expanse.

Xenica, *Westw.*

8. X. achanta, *Don.*

Pap. A., Ins. N. H., A. 22, f. 2, 1805.

Syn.—Tisiphone Achanthe, *Hub.*, Zutr. Ex. Sch., f. 267, 268, 1823 ; Lasiomata ocrea, *Guest*, Tr. Roy. Soc. S.A., V., p. 35, 1882.

Common during December and January at Waterfall Gully ; also taken near Balhannah. Not mentioned in Tepper's 1881 list.

9. X. Klugii, *Guer.*

Sat. K., Voy. Coq., t. 17, fig. 2, 1829 ; *Tepp.*, Tr. Roy. Soc S.A., for 1881.

Syn.—Satyrus Singa, *Bdv.*, Voy. Astrol. Lep., p. 145, n. 3, 1832; Las. philerope (pars), *Westw.*, l.c. 19, 1851.

Blackwood, Waterfall Gully, Belair, &c.; most common at Belair during November and December.

HETERONYMPHA, *Wallen.*

10. HET. MEROPE, *Fab.*

Pap. M., Syst. Ent., p. 495, n. 228, 1775; *Tepp.*, Tr. Roy. Soc. S.A., for 1881.

Syn.—Oreas Nubila Œnomais, *Hb.*, Samm. Ex. Sch., I., t. 94, figs. 1-4, 1806; female, Pap. Themis, *Dalm.*, Anal. Ent., p. 42, n. 10, 1823; male, Sat. Archemor, *Godt.*, Enc. Meth., IX., p. 500, n. 82, 1819.

Woodside, Belair, Mount Gawler, Teatree Gully, Blackwood; common during November, December, and January. I have noticed that the male insects appear earlier than the female.

PYRAMEIS, *Hub.*

11. P. ITEA, *Fab.*

Pap. Itea, Syst. Ent., p. 498, n. 238, 1775; *Tepp.*, Tr. Roy. Soc., 1882.

Parkside, Blackwood, Yorketown, Mount Gawler, Belair, &c.; common September to March. Feeds on stinging nettle (*Urtica urens*). I have bred them from the chrysalis in November, and also in March, so that it would appear to have two broods during the year.

12. P. KERSHAWI, *McCoy.*

Cynthia K., Ann. N. H., ser. 4, I., p. 76, 1868; P. Cardin, *Tepp.*, Tr. Roy. Soc., for 1881.

Common at Parkside, Petersburg, Yorketown, Waterfalls, &c. I have bred this species in December, the chrysalis being found under *dry* clumps of cowdung. It is on the wing from August to May.

JUNONIA, *Hb.*

13. J. VELLIDA, *Fab.*

Pap. V., Mant. Ins., p. 35, n. 366, 1787; *Tepp.*, Tr. Roy. Soc., IV., 1882.

Common at Parkside, Woodside, Waterfall Gully, Belair, &c., from September to March, frequenting dry ground, especially those of a red-clay nature, the colour of which no doubt protects the species from observation. Sometimes they are very dwarfed in appearance. I have specimens less than one inch in expanse. In Tepper's list the name is incorrectly spelt as "Junonisa."

Lucia, *Swain.*

14. Lucia Lucanus, *Fab.*

Hesp. L., Ent. Syst., III., 1, p. 322, n. 221, 1793.

Syn.—L. limbaria, *Swain* (nec Blanch), Zool. Ill. Ins., II., t 135, 1833; Chrysophanus discifer, *H. S.*, Stett. Ent. Ziet, p. 72, n. 21, t. 4, f. 21, 1869; *Tepp.* (Lycæna D.), Tr. Roy. Soc. S.A., IV., 1882.

As Miskin rightly points out, this species has been confused with *Chrysophanus aurifer*, Blanch, a very dissimilar species, and to my knowledge not taken here, although said to be, the mistake no doubt being caused by wrong identification.

Woodside, Black Forest (South-road), Parkside, &c., not common, frequents stinkwort (*Inula graveolens*) during October to May.

Lampides, *Hub.*

15. L. Bœticus, *Linn.*

Pap. B., Syst. Nat., 12 ed., I., 2, p, 789, n. 226, 1767; *Tepp.* (Cupido B.), Trans. Roy. Soc., IV., 1882.

Syn.—Hesperia Bœtica, *Fab.*, Ent. Syst., III., 1, p. 280, n. 77, 1793; Pap. Colutheæ, *Fuess*, Schweiz. Ins., p. 31, n. 594, f. 2, 1775: Pap. Damœtes, *Fab.*, Syst. Ent., p. 526, n. 350, 1775; Pap. Damœtas, *Esper.*, Ges. Eur. Schm., t. 28, f. 1a, 16, t. 29, f. 1a 1b, 1806-18; Pap. pisorum, *Fourc.*, Ent. Paris, II., p. 242, n. 25, 1785; Pap. Archias, *Cram.*, Pap. Ex., II., t. 181, f.c. 1777.

A cosmopolitan sp. Parkside, Woodside, &c., &c. Common during December, November, to February.

Lycæna, *Fab.*

16. L. biocellata, *Feld.*

Reise Novara, Lep., II., p. 280, n. 352, t. 35, f. 14, 1869.

Syn.—Cupido adamapuncta, *Tepp.*, Tr. Roy. Soc. S.A., IV., 1882.

Parkside, Blackwood, Waterfall Gully, from August to February. Most common at Blackwood in August.

17. L. labradus, *Godart.*

Poly. L., Enc., Meth., IX., p. 680, n. 197, 1819.

Syn.—Lyc. communis, *H. S.*, Stett. Ent. Zeit., p. 72, n. 36, 1869; Lyc. Alsulus, *H. S.*, l.c., 1869, p. 75; female, Poly. Diogenes, *Blanch*, Voy. Pole Sud., IV., Ins., p. 397, t. 3, f. 7-8, 1855; Lyc. Phœbe, *Murray*, Ent. Mo. Mag., X., p. 107, 1873; Cupido delicata, *Tepp.*, Tr. Roy. Soc. S.A., IV., p. 30, t. 2, f. 12, 1882; Lycæna pervulgatus, *Guest*, l.c., V., p. 36, 1882.

Common from December to March. Waterfall Gully, Woodside, Belair, Parkside, &c.

18. L. SERPENTATA, *H. S.*

Ent. Zeit., p. 74, p. 32, 1869.

Syn.—Cupido molybdena, *Guest*, Tr. Roy. Soc., S.A., IV., p. 36, 1882. C. fasciola, *Tepp.*, l.c., p. 30, t. 2, f. 13, 1883.

Waterfalls, Parkside, &c. Common. On the banks of the River Torrens (at the back of Police Barracks) we have taken this species in abundance during January and February, frequenting a weed.

19. L. AGRICOLA, *D. H.* and *W.*

Lucia A., Gen. D.L., II., p. 496, note t. 76, f. 4, 1850-2; *Tepp.*, Tr. Roy. Soc. S.A., IV., p. 29, t. 2, f. 8, 1882.

Belair and Blackwood, not uncommon during October and November.

HOLOCHILA, *Feld.*

20. H. HEATHI, *Cox.*

L. Heathi, Ent., IV., p. 402, 1873.

Syn.—Lyc. paradoxa, *Guest*, Trans. Roy. Soc. S.A., 1882.

Waterfalls, Belair, Blackwood, &c. October to January, most common at Belair in January; frequenting flowers of *Bursaria spinosa*, the colour of which agrees remarkably well with that of the insect, *i.e.*, the underside.

21. H. ERINUS, *Fab.*

Pap. E., Syst. Ent., p. 525, n. 348, 1775.

Syn.—H. anita, *Semp.*, Mus., Godf., Lep., XIV., p. 163, 1878; male, H. hyacinthus, *Sp.*, l.c. 162, 1878; Scott, Mss. Lyc. bimaculosa, *Leach*, Mss.; Cupido simplexa, *Tepp.*, Tr. Roy. Soc., S.A., 1881; Lyc. Mœrens, *Ros.*, Ann. *H. S.*, ser. 5, XVI., p. 377, 1885; Pol. subpallidus, *Lucas*, Pro. R. Soc. Q., VI., 1889.

Cherry Gardens, Woodside, Belair, Blackwood. September to February, very common at Blackwood in February.

Our species appear to be the var. (?) *Mœrens*, Rosen, but I think it is a good species, and not a variety.

HYPOCHRYSOPS, *Feld.*

22. HYP. IGNITA, *Leach.*

Lyc. I., Zool. Misc, I., p. 136, t. 60, fig. 1-3, 1814.

Port Lincoln and Blackwood. Very scarce, taken during November and December. Beaten from *Acacia pycnantha*,

which is in all probability its food plant; as an allied species *H. delicia*, Hew., feeds on "Blackwood" *(Acacia melanoxylon)*. This beautiful specimen has not been recorded previously for S.A.

IALMENUS, *Hub.*

23. I. ILLIDGEI, *Lucas.*

Proc. Royal Soc. Queensland, p. 156, f. 1-2, 1889.

Parkside and Highbury. Common in larval state, but more scarce in the wing. Not previously taken here.

In Miskin's Catalogue for 1891 I notice that this species is quoted as synonymic with *ictinus*, Hew. Now, I am always amenable to reasonable queries, but I think Miskin goes a little too far. There is as much difference, if not more, between the two above-mentioned than between *Lyc. agricola*, D. H. and W., and *serpentata*, H. S. If they are the same as Miskin says, how is it that we do not get "ictinus" down here? And how is it that our larvæ are *green*, whilst the Brisbane and Victorian forms are *brown?* The typical "Illidgei" differs very little from our species, and is immediately recognisable by the absence of black markings on underside, which are so prominent in the true "ictinus." Larva full fed. Length, 26 mm. Moderately stout, tapering at both ends. Head small, shining black, with a few whitish scattered strigula. Body bright yellowish-green, sides more yellowish; second segment with two curiously raised wart-like protuberances of a dark crimson colour, which are thickly covered with moderately long hairs; third and fourth segments with somewhat similar protuberances, but not hairy, like second. Segments from seven to ten inclusive are marked with curious uninterrupted wedge-shaped spots on dorsum. On each side of these spots is a deep crimson blotch, corrugated at sides, the posterior portion being raised in the form of an erect projection—those on anal segment much larger—sparsely furnished with hairs. Spiracles ochreous-yellowish, margined with brown. Beneath each spiracle is a tuft of scattered hairs, generally about six. Anal segment is densely covered with short blackish hairs. Belly light green, sides densely clothed with short whitish hairs.

Chrysalis pitchy-black, shining. Abdominal segments marked with ochreous-yellow lines. A similar line placed dorsally from head to base of thorax, and continued round the wing-covers. Spiracles orange-yellow. Length, 13 to 15 mm. Feeds on *Acacia pycnantha*, the larva being covered with small ants. The chrysalis is usually found at the foot of the tree, and the perfect insect emerges in from six to nine days, males predominating.

24. I. INOUS, *Hew.*

Ill. D. L., p. 54, n. 3, t. 24, fig. 1-2, 1865.

Syn.—I. icilius, *Hew.*, l.c., fig. 3; Cupido æneus, *Tepp.*, Trans. R. Soc. S.A., IV., p. 29, t. 2, f. 9, 1882.

Parkside (rare), Blackwood, Highbury, Belair, &c., November to January. Most common at Belair in January.

Ogyris, *Westw.*

25. O. otanes, *Feld.*

Reise Nov. Lep., II., p. 217, n. 234, t. 28, f. 1-3, 1865; *Tepp.*, Tr. Roy. Soc. S.A., IV., p. 31, t. 2, f. 1, 1882; *Tepp.*, male, O. halmaturia, male, Nat. Ins. S.A., part II., p. 12, 1890.

Victor Harbor, Kangaroo Island, Yorketown. December to February. Most common at Yorketown (frequenting "Mallee," *E. oleosa*) in February. Miskin thought this might be a small form of "Genovera," *Hew.*, but this is wrong.

As will be noted above, the male is described as the male "halmaturia."

26. O. idmo, *Hew.*

Cat. Lyc., B. M., p. 2, n. 7, t. 1, f. 3, 4, 1850-52.

Syn.—Male, O. halmaturia, *Tepp.*, female, Nat. In. S.A., pt. II., p. 12, 1890,

Pt. Lincoln, two specimens, taken by the Rev. T. Blackburn, also at Kangaroo Island, where Mr. Tepper informs me it is common.

As will be seen above, the male of this species has been described as the female of *O. halmaturia*, Tepp., the description of which tallies exactly with *idmo*, so that Tepper's name must rank as synonymic.

27. O. orætes, *Hew.*

Female, Cat. Lyc., B. M., p. 3, n. 12, t. 1, f. 12, 13, 1862; male, *Tepp.* Tr. Royal Soc. S.A., 1886 (O. amaryllis).

Yorketown, Moonta, not uncommon, frequenting *Eucalyptus oleosa* in February. I once obtained during November at Belair chrysalides of this species under the bark of *Eucalyptus rostrata*, but was unable to rear them.

27. O. Amaryllis, *Hew.*

Female, Cat. Lyc., B. M., p. 3, n. 11, t. 1, f. 5, 6, 1862; *Tepper*, Tr. Roy. Soc. S.A., 1886; *Miskin*, male, Proc. Linn. Soc., N.S.W., 1890.

Five specimens from Yorketown; frequents *Euc. oleosa.*

This and the previous species have been confused by Mr. Tepper in his paper of 1886 (Tr. Roy. Soc. S.A.) inasmuch that after quoting Hewitson's (Newman's ?) description of the female he proceeds and describes the male *orætes*, Hew., as the male of the present species. For further reference see Miskin's able paper in Linn. Soc. of N.S.W. Proc., ser. 2, V., p. 26, 1886.

28. O. OLANE, *Hew.*

Cat. Lyc., B. M., p. 2, n. 10, t. 1, fig. 10-11, 1862.

One male of this species was recently captured at Kent Town (near Smith's brewery) by my young friends the Messrs. Angel. Not previously recorded from here. Whilst writing on this genus, it may be interesting to state that the young larvæ are usually found covered with ants, which are said to feed on the sweet secretion which this (and other genera) usually emit. My valued correspondent, Mr. F. Spry, of Melbourne, is of opinion, however, that the ants use the bodies of the larva to clean themselves, like a doormat, as he puts it; this is more noticeable in one species, *i.e.*, *O. abrota*, which is covered with short stiff hairs, making his argument more conclusive. Another curious fact he mentions is that in breeding the different species the ants, when placed in confinement with the larvæ, rapidly die. One would think, however, that if the ants feed on the secretion emitted they could live as well confined as in natural conditions, but such it seems is not the case, so that it remains for those who have the opportunities to settle the question satisfactorily. I may mention that the above-named gentleman has bred several of the genus, and can speak with a certain amount of authority; and in concluding his remarks he mentions that the larvæ are greatly subject to the attacks of parasitic hymenoptera, diptera, and fungoid diseases, which no doubt accounts for their rarity; and states that some of the species use the empty gall-cases of diptera, &c., to live in. This is more noticeable when the eggs are laid on the close-barked *Eucalyptus melliodora*, as the larvæ, instead of wasting their energy by endeavouring to get under the tough bark, adapt themselves to circumstances, and take possession of the gall-chambers.

PAMPHILA.

29. P. GRACILIS, *Tepper.*

Hesperilla gracilis, Trans. Roy. Soc. S.A., IV., p. 34, t. 2, f. 7, 1882.

Six specimens taken in December at Henley Beach.

APAUSTUS, *Hb.*

30. AP. AGRAULIA, *Hew.*

Ancyloxypha agraulia, *Hew.*, Desc. Hesp., p. 45, n. 3, 1868.

Syn.—Pamphila sunias, *Feld.*, Sitzb. Ak. Wiss. Wien. Math. Nat. bl., XI., p. 462, n. 54, 1860.

Not previously recorded from South Australia. Slape's Gully, two specimens, and Botanic Gardens, Adelaide, in February and March; not uncommon frequenting blossoms of *Gomphrena*

officinalis (Globe Amaranth) and *Centranthus ruber*, flying swiftly in sunlight.

TRAPEZITES, *Hub.*

31. TRAP. PHILLYRA, *Miskin.*

Proc. Roy. Soc. Queensland, p. 152, 1889.

One fine specimen of this beautiful species at Blackwood in October, not previously recorded from South Australia.

32. TRAP. PHIGALIA, *Hew.*

Hesp. p, Desc. Hesp., p. 32, n. 23, 1868.

I have a specimen doubtfully referable to this species from Port Lincoln.

33. TRAPEZITES LUTEA, *Tepp.*

Hesperilla lutea, Tr. Royal Soc. S.A., IV., p. 33, t. 2, f. 6, 1882; Trap. petalia, *Misk.*, Ann. Q. Museum, I., 1891, p. 78.

Two specimens, Slape's Gully, in December.

Miskin in his 1891 catalogue makes this species synonymous with *T. petalia*, Hew., while Tepper himself considers his *Hesperilla quadrimaculata* identical with it (*i.e.*, petalia). I have received a specimen of a male "petalia" from Mr. R. Illidge, of Brisbane, which is certainly distinct from any taken here. My opinion is that Tepper's *Hesp. trimaculata* is the male of his *quadrimaculata*, but in the absence of proper literature I cannot decide the question satisfactorily. The whole of the Hesperidæ are in a very unsatisfactory condition, and when my promised literature is at hand, I will give my deliberations to our Society.

34. TRAP. TRIMACULATA, *Tepp.*

Hesperilla T., Trans. Roy. Soc. S.A., IV., p. 32, t. 2, f. 4, 1882.

Several specimens, *all males*, at Belair, frequently dry rocky ground in November.

35. TRAP. QUADRIMACULATA, *Tepp.*

Tr. Roy. Soc. S.A., IV., p. 32, t. 2, fig. 2, 1881.

Two *females* at Blackwood, 11th November, also from Balhannah. As before stated, I am of opinion that this and the preceding are sexes of the same species. Not having taken the opposite sex in either case seems more convincing.

HESPERILLA.

36. HESP. DONNYSA, *Hew.*

Male. Desc. *Hesp.*, p. 39, n. 3, 1868.

One sp., from Port Lincoln, in December. Not previously recorded from here.

37. Hesp. atralba, *Tepp.*

Trans. Roy. Soc. S.A., IV., p. 33, t. 2, f. 5, 1882.
One sp., from Port Lincoln (Rev. T. Blackburn).

38. Hesp. dactyliota, *Meyr.*

Telesto D., Tr. Linn. Soc. N.S.W., ser. 2, II., p. 831, 1888.
I have not seen this species. In the original description it is stated to occur at Port Lincoln and to be common in West Australia; but Mr. Meyrick writes that the species is unique in his collection.

Taractrocera, *Butler.*

39. T. bifasciata, *Tepp.*

Hesp. bifasciata, Tr. Roy. Soc. S.A., IV., p. 32, t. 2, f. 4, 1882; Tar. flavovittata, *Miskin*, Cat., 1891.
One sp., Lyndoch (*Tepper*). Miskin is under the impression that this is *T. flavovittata*, Satr., and as the type (*bifasciata*) is lost, the question must be left in abeyance for the present.

40. T. papyria, *Bdv.*

Hesp. p., Voy. Astr. Lep., p. 166, 1832.
Syn.—Hesperilla fumosa, *Guest*, Tr. Roy. Soc., S.A., V., 1882; Apaustus minimus, *Misk.*, Proc. R. Soc. Q., p. 153, 1889.
Parkside, Woodside, Balhannah, December to March, frequenting stinkwort (*Inula graveolens*).

The following are reputed South Australian species :—

41. Delias Harpalyce, *Don.*, Tepper's list.
42. " Argenthona, *Fab.*, Tepper's list.
43. Chrysophanus aurifer, *Blanch.*
44. Holochila acasta, *Cox.*
45. Ialmenus evagoras, *Don.**
46. Hesperilla Dirphia, *Hew.*
47. Taractrocera celœno, *Cox.*

Not having seen or taken specimens in South Australia, I omit them for the present.

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* On reference to Tepper's Common Native Insects of S.A. part II., I find that his description applies to *inous*, Hew., so that *evagoras*, Don., can be struck off the list.

The Flora of Roebuck Bay, West Australia.

By J. G. O. Tepper, F.L.S.

[Read February 7, 1893.]

The species of plants of which the following list is an enumeration were collected by my son (J. W. O. Tepper) during the exceptionally dry years 1889 to the close of 1891. They were submitted to Baron Sir Ferd. von Mueller, F.R.S., &c., for identification; many of them were kindly determined by him; of the rest the genera only were indicated. In the latter case I have endeavoured by careful comparison with the descriptions to fix the species. Where there is any doubt remaining on account of insufficiency of the material obtainable, a note of interrogation follows the name.

The collector, with many other duties to attend to, and rarely leisure for extended excursions, procured most of the plants within the immediate neighbourhood of Roebuck Bay; the others were obtained at a visit to Hancock's Cattle Station, about 25 miles inland, an excursion to a part of the coast some seven to ten miles southward, and on a telegraph-line-repairing trip of about 30 miles towards Derby. Want of time prevented him also to attend to the matter systematically, and to supplement the specimens occurring at some considerable distance; hence the doubt attaching to some of the species. Incomplete as the list is, yet it affords a good illustration of what constitutes the flora there in very dry seasons. At the end of 1891 my son wrote that not only did the majority of shrubs or plants fail to put forth flowers or fruit, but remained or became nearly leafless! There existed then neither flowing nor stagnant water (fresh or brackish) at the localities examined, excepting the sea; and grasses or grass-like plants were rare or wholly absent. The locality must, therefore, be considered as belonging to the great Central Australian Desert, and its flora becomes very interesting as representing the extreme north-western extension of that region.

Roebuck Bay, or Port Broome, as it has been named recently, is situated on the north-west coast of Australia, in longitude 122° 12′ 36″ E., and latitude 10° 0′ 15″ S. It was sighted by the earliest Dutch navigators, and visited by Dampier about 1688, who named it after his vessel. The bay is formed by the mainland on the south, and by a narrow peninsula (five miles long by

two miles wide) on the north, the latter extending in a southerly direction, and separating Roebuck from Gantheaume Bay. The coastline exhibits low, steep cliffs of red sandstone at the base, 12 to 20 feet high, and overlain by sand or arenaceous clays, from 40 to 80 feet in thickness. The former, however, retreat sometimes for miles inland. The sea margin at the head of the bay is covered by mangrove (*Avicennia officinalis*, L.), succeeded by open grassy flats several miles wide, gradually passing into gentle rises and undulating hills (covered more or less thickly with scrubby vegetation) and more elevated grass lands. Roebuck Bay is, and has been for many years, one of the chief harbours of the pearling fleets, and has become the starting place of the West Australian submarine cable, as well as one of the ports of approach to the Kimberley gold-diggings, hence a small township has sprung up since 1890. The climate is extremely hot and dry, the maximum temperature being above 100° F. in the shade for many months in succession, and sinks rarely as low as 60° F. During the three years 1889-91 the rainfall was extremely scanty and insufficient, and appears to be uncertain, intermittent, and of short duration usually, though sometimes is heavy and accompanied by violent thunderstorms.

As informed by Sir Ferdinand v. Mueller, the locality had remained botanically almost unknown, notwithstanding its early discovery. Messrs. King and Gregory collected some plants there, but the former only near the coast, while most of the specimens of the latter proved unsatisfactory. Thus it is almost the first time that the locality has been extensively examined in regard of its botany, and my best thanks are due to my son for spending much of his scanty leisure in the collection and preparing of the specimens which form the subject of this paper, notwithstanding his other arduous duties and the unfavorable nature of the climate. There are enumerated 143 species (besides one wholly undetermined) comprised in 100 genera and 44 orders.

SYSTEMATIC LIST OF ROEBUCK BAY PLANTS.

[The months are those attached by the collector, and denote the flowering season, unless stated otherwise.]

Capparideae.

Cleome tetrandra, *Banks.* January, 1890.
——— viscosa, *L.* July, 1889.
Capparis lasiantha, *R. Br.* August, 1890.
——— spinosa, *L.* July, 1889.

Violaceae.

Hybanthus suffruticosus, *F. v. M.* December, 1889.

Droseraceae.

Drosera petiolaris, *R. Br.* February, 1891.
Byblis linifolia, *Salisbury.* February, 1890.

Polygaleae.

Polygala Tepperi, *F. v. M.* January, 1890.

Zygophylleae.

Tribulus hystrix, *R. Br.* September, 1889 (badly affected by a black, aphis-like insect).

Malvaceae.

Sida virgata, *Hooker.* February, 1890.
—— subspicata ?, *F. v. M.* July, 1889; February, 1890.
Abutilon graveolens ?, *W.* and *A.* July, 1889.
———— Cunninghami ?, *Bentham.* December, 1889.
Hibiscus microlaenus, *F. v. M.* January, 1890.
———— leptocladus, *Bentham.* January, 1890; December, 1889.
———— panduriformis, *Burmann.* March, 1890.
Gossypium australe, *F. v. M.* September, 1889.

Sterculiaceae.

Brachychiton diversifolius, *R. Br.* May, 1890.
Melhania incana, *Heyne.* August, 1889.
Commerçonia loxophylla ?, *F. v. M.* December. 1889.
Seringea corollata, *Steetz.* August, 1889.

Tiliaceae.

Grewia breviflora, *Bentham.* October, 1889.
Corchorus fascicularis, *Lamarck.* February, 1890.
———— sidoides, *F. v. M.* July, 1889.

Euphorbiaceae.

Euphorbia Mitchelliana ?, *Boiss.* July, 1889; September.
Phyllanthus ramosissimus ?, *F. v. M.* November 1889 ("Without fruit; perhaps new," F. v. M., in *litt*).
Securinega obovata, *F. v. M.* February, 1890.
Adriana tomentosa, *Gaudichaud.* April, 1890.
Mallotus aff. nesophilus, *F. v. M.* July, 1890.

Sapindaceae.

Atalaya hemiglauca, *F. v. M.* September, 1889.
——— variifolia, *F. v. M.* September, 1889.
Distichostemon phyllopterus, *F. v. M.* October, 1889.

Stackhousiae.

Stackhousia muricata, *De C.* March, 1890.
———— viminea, *Smith.* February, 1891.

Portulaceae.

Portulaca bicolor, *F. v. M.* February, 1891.
——— sp. January, 1890. "Different from all known forms."—*F. v. M.*

A low spreading herb, probably annual, 3 to 4 inches, branches numerous, opposite or alternate, basal leaves soon lost, stipular hairs numerous, very short, more persistent than the leaves; leaves opposite or alternate, narrow oval, oblong or almost obovate, $\frac{1}{4}$ to $\frac{3}{4}$ inch, in the specimens nearly all crowded at and near the apex of the branchlets. Flowers terminal, solitary, sessile between four or more floral leaves. Sepal broadly ovate, about $\frac{1}{4}$ inch. Petals pink (?), $\frac{1}{2}$ inch or more, broad, fugaceous. Capsule and seed not seen. The provisional name, *P. dubia*, is suggested.

Claytonia (Calandrinia) polypetala, *F. v. M.* January, 1890.

Caryophylleae.

Polycarpaea corymbosa, *Lamarck.* July, 1889.

Amarantaceae.

Gomphrena canescens, *R. Br.* August, 1889.
Ptilotus alopecuroides, *F. v. M.* September, 1889.
——— exaltatus, *Nees.* March, 1890.
——— Schwartzii ?, *F. v. M.* August, 1889.
——— Cunninghami, *Bentham.* September, 1889, in fruit; March, 1890, in flower.
Amarantus pallidiflorus, *F. v. M.* January, 1890.
"Used like cabbage by the natives as a vegetable."—*J. W. O. T.*

Salsolaceae.

Salsola Kali, *L.* November, 1889.

Ficoideae.

Trianthema pilosa, *F. v. M.* January, 1890, in flower; August, 1889, in fruit.

Phytolacceae.

Gyrostemon cyclotheca, *Bentham.* September, 1889, male flowers; February, 1890, female, in fruit.

Nyctagineae.

Boerhaavia diffusa, *L.* September, 1889; January, 1890.
——— repanda, *Willd.* July, 1889.

Leguminosae.

Isotropis atropurpurea, *F. v. M.* July, 1889.
Crotolaria crispata, *F. v. M.* April, 1890.
——— linifolia, *Linné fils.* April, 1891.

Crotalaria Cunninghamii, *R. Br.* September, 1889.
———— medicaginea, *Lamarck.* Small variety July, 1889; large variety March, 1890.
Psoralea Archeri, *F. v. M.* September, 1889.
Indigofera linifolia, *Retzius.* March, 1890.
———— viscosa, *Lamarck.* January, 1890, in flower; fruit in April, 1890.
———— hirsuta, *Linné.* February, 1890.
———— enneaphylla, *Linné.* February, 1891.
Tephrosia filipes. *Bentham.* January, 1890.
———— remotiflora, *F. v. M.* February. 1890.
———— purpurea, *Persoon.* September, 1889; flowers and fruit.
Zornia diphylla, *Persoon.* February, 1890; September, 1889, in fruit.
Uraria cylindracea, *Bentham.* February, 1891.
Alysicarpus longifolius, *Wight* and *Arnott.* 2-3 ft. high. November 19, 1890.
Galactia tenuiflora, *Wight* and *Arnott.* February, 1891.
Canavalia obtusifolia, *De C.* May, 1890. Flowers and fruit.
Abrus precatorius, *Linné.* February, 1890.
Caesalpina (Guilandina) Bonduc, *Linné.* December, 1889. Flowers and fruit.
Cassia notabilis, *F. v. M.* July, 1890. Flowers and young fruit.
——— pruinosa, *F. v. M.* End of December, 1889. Flowers and fruit.
——— oligoclada, *F. v. M.* January, 1890.
——— concinna, *Bentham.* March, 1890. Flowers and fruit.
Bauhinia Leichhardtii, *F. v. M.* August, 1889, in flower; September, 1889, in fruit.
Acacia lycopodifolia, *Cunn.* July, 1889.
——— holosericea, *Cunn.* Shrub 4 to 6 ft.; September, 1890.
——— tumida?, *F. v. M.* August, 1889.
——— acuminata?, *Bentham.* August, 1889.
——— bivenosa, *De C.* Four to five feet. October, 1891. Flowers and fruit.
——— signata?, *F. v. M.* August, 1890.
——— impressa?, *F. v. M.* May, 1890.

Combretaceae.

Terminalia petiolaris, *A. Cunn.* Flowers, December, 1889; fruit, January, 1890.
———— latifolia, *F. v. M.* January, 1890.
Native name, "Yamanarrie," fruit edible and slightly acid.—*J. W. O. T.*

Gyrocarpus Americanus, *Jacquin.* December, 1889,
"Tree 30 to 40 ft. high; leaves, though bright green when alive, always drying black."

Myrtaceae.

Calycothrix microphylla, *Cunn.* September, 1889.
Melaleuca leucodendron, *Linné* March, 1890.
Eucalyptus clavigera, *Cunn.* December, 1889.
———— terminalis, *F. v. M.* December, 1891.

Rhamnaceae.

Ventilago viminalis, *Hooker.* July, 1890.

Santalaceae.

Santalum lanceolatum, *R. Br.* Middle of November, 1889; fruit.
Exocarpus latifolius, *R. Br.* Tree, 10 to 15 feet; November, 1890.

Loranthaceae.

Loranthus amplexifolius, *F. v. M.* September, 1889.
———— bifurcatus, *Bentham.* July, 1890.

Proteaceae.

Persoonia falcata, *R. Br.* October, 1891.
Grevillea refracta, *R. Br.* February, 1890.
———— mimosoides, *R. Br.* July, 1889.
Hakea macrocarpa, *A. Cunn.* July, 1889.
———— arborescens, *R. Br.* December, 1889; February, 1890.

Rubiaceae.

Oldenlandia trachymenoides, *F. v. M.* February, 1890.
Gardenia Pantoni, *F. v. M.* October, 1889.
Ixora tomentosa, *Roxburgh.* November, 1889.
Canthium oleifolium, *Hooker.* Flowers, end of December, 1889 fruit, December, 1890. A tree 15 to 20 feet high.
Spermacoce pogostoma, *Bentham.* Flowers, July; fruit, November, 1889.

Compositae.

Vernonia cinerea, *Lessing.* End of December, 1889; flowers and fruit.
Pluchea tetranthera, *F. v. M.* April, 1891; flowers and fruit.
Pterigeron macrocephalus, *Bentham.* September, 1889; flowers and fruit.
Pterocaulon sphacelatus, *Bentham.* September, 1889; flowers and fruit.

Goodeniaceae.

Calogyne Berardiana, *F. v. M.* January, 1890; seeds orbicular.

Velleya panduriformis, *Cunn.* End of November, 1889; June, 1890.

Leschenaultia sp. May, 1890.

Intricately and dischotomously branched under-shrub. Leaves minute, sessile, acute. Flowers not seen. Fruits obovate, gradually narrowed to the base; apex rounded or subtruncate, one-third to one-half inch long, about one-eighth inch thick; peduncle very short, apex thickened. Branches and branchlets very slender, nodes distant.

Loganiaceae.

Mitrasacme lutea, *F. v. M.* February, 1891.

———— n. sp.? November, 1889.

Small herb. Leaves radical linear, narrowed at the base into a very short pedical, apex truncate or obtuse. Peduncle slender, erect or ascending, about two inches, with one or two short branches above the middle. Flowers rather large terminal. Sepals broadly ovate, acute, about one line. Petals pale pink or white, about one-third of an inch. Fruit not seen. There is a minute, scale-like bract below the branches, and another near the middle of the latter, but none on the main peduncle beyond the bifurcation. The bracts terminate in a short recurved bristle.

Jasmineae.

Jasminum aff. didymum, *G. Foster.* November, 1889.

"The leaves are much narrower than of any other form of *J. didymum.* The fruit may be different, and if so, the species would be new for Australia."—*F. v. M., in litteris.*

Apocyneae.

Carissa Brownii, *F. v. M.*, var. angustifolia. November, 1889.

Wrightia saligna, *F. v. M.* December, 1889.

Asclepiadeae.

Gymnema stenophyllum, *A. Gray.* December, 1889.

Marsdenia aff. velutina, *R. Br.* February, 1891. Flowers and fruit.

Convolvulaceae.

Convolvulus parviflorus, *Vahl.* March, 1890.

Ipomaea diversifolia, *R. Br.* April, 1891.

———— heterophylla, *R. Br.* April, 1891.

———— aff. eriocarpa, *R. Br.* February, 1890.

Polymeria angusta, *F. v. M.* February, 1890.

Evolvulus linifolius, *Linné.* September, 1889; December, 1889

Solanaceae.

Solanum diversifolium ?, *F. v. M.* December, 1891.
"Growing near water, 40 miles south of Roebuck Bay."—*J. W. O. T.*
——— quadriloculare, *F. v. M.* December, 1889.
——— esuriale, *Lindley.* September, 1889.

Scrophularinae.

Buechnera gracilis, *R. Br.* April, 1890.

Bignoniaceae.

Dolichandrone heterophylla, *F. v. M.* April, 1890.

Acanthaceae.

Hypoëstes floribunda, *R. Br.* September 24, 1889.

Asperifoliae.

Ehretia saligna, *R. Br.* November, 1889.
Heliotropium paniculatum, *R. Br.* October, 1889.
———— Cunninghamii ?, *Bentham.* September 24, 1890.
Polichia Zeylanica, *F. v. M.* August, 1889.

Verbenaceae.

Premna integrifolia, *Linn.* January, 1890.
Clerodendron floribundum, *R. Br.* Flowers, November, 1889; fruit, April, 1890.
——-—— tomentosum, *R. Br.*, var. September, 1889; March, 1890.
Avicennia officinalis, *Linné.* End of December, 1889. In fruit only.

Myoporineae.

Myoporum Dampieri, *Cunn.* July 6, 1889.

Orchideae.

Cymbidium canaliculatum, *R. Br.* November, 1891.
"Rare. Only found growing on large galls or swellings affecting *Eucalyptus clavigera.*"—*J. W. O. T., in litt.*

Commelineae.

Aneilema gramineum, *R. Br.* January, 1890; February, 1891

Cyperaceae.

Cyperus eragrostis ?, *Vahl.* December, 1889.
——-— (Mariscus) conicus, *Boeckel.* End of December, 1889.

Gramineae.

Spinifex longifolius, *R. Br.* November, 1889.
Eragrostis eriopoda, *Bentham.* April. 1890.

The "Mirrn-yong" Heaps at the North-West Bend of the River Murray.

By R. Etheridge, jun., Palæontologist to the Australian Museum, and Geological Survey of New South Wales.

[Read March 7, 1893.]

Sir T. L. Mitchell, Surveyor-General of New South Wales in the early days, described* the aboriginal method of cooking food in general "by digging a hole in the ground, making a fire in it, and heating stones about." This may be accepted as a perfectly accurate statement couched in very general terms, and is more or less applicable to almost every part of the Continent, for whatever modification may locally exist, stones, in one way or the other, enter into the operation.

For the purpose of more precise description, the cooking or feasting-places of the aborigines may be arranged under four sections :—

1. Kitchen-middens, or shell-mounds of the coast line.
2. *Mirrn-yong* heaps.
3. Native, or Blackfellows' Ovens.
4. Cave-shelter, or *Gibber-gunyah* hearths.

This classification, like so many others in different branches of Natural Science, is but artificial and provisionary, for it is possible without much difficulty to select a case in which the conditions partake of those of more than one of the above sections.

The *Mirrn-yong* heaps of the Murray, of which it is intended to give a short description in the present communication, are a case in point. They are not strictly identical with similar heaps to be met with in many parts of Victoria, or with the Blackfellows' Ovens of the same colony, but in a greater or less degree combine the characters of both.

It is hardly necessary to refer to the other section just now, but perhaps it may be as well to explain the limit attached to the use of the terms. The term Kitchen-midden is restricted to the large shell-heaps occurring at intervals around the coast-line, exhibiting a rough stratification, and composed of whatever species of shells the natives of any particular neighbourhood may have been in the habit of existing on. Native, or Blackfellows' Ovens appear usually as stony irregularities of the surface, more or less circular, often of large size, and grassed with great luxuri-

* Three Expeditions Int. E. Australia, II., p. 343.

ance and wealth of colour. Each mound consists of a collection of wood-ashes, charcoal, and stones, and is of a depressed conical shape. The diameter varies from a foot or two up to eighty, and two feet high in the centre. The distribution of these ovens is limited, being recorded only from Central and Western Victoria, and across the Murray into New South Wales as far as the Lachlan.

Cave-shelter, or *Gibber-gunyah* hearths are deposits, of tenin the form of a talus, at the mouths and entrances of the semi-caverns formed by overhanging ledges of rock, and are particularly common throughout the Hawkesbury Country of New South Wales, when contiguous to saltwater creeks or arms of the sea. These shelters appear to have been continuously inhabited for long series of years. The tali consist of stratified ashes, burnt and unburnt shells, charcoal, and other *débris*, with here and there a few stones.

Lastly *Mirrn-yong* heaps are usually found contiguous to rivers, lakes, or marshes, and in a sheltered situation. They consist of oval, or at any rate, longer than broad depressed mounds, often of considerable extent, as much as one hundred feet long, made up of soil, burnt clay, wood-ashes, charcoal, burnt fresh-water shells, burnt and unburnt bones, tomahawks (whole or fragmentary), chips of other rocks, and works of industry, such as bone awls, bone nose-ornaments, and the less perishable articles of aboriginal everyday use. Within these heaps the scattered cooking places, composed of stone, occur, each site having been used by generation after generation of blacks, and the entire mass slowly heaped together, thus representing the work of a long period of years.

It is to this section that I believe the refuse heaps at the North-West Bend are referable.

Under the excellent guidance of Prof. R Tate, and with Mr. H. Y. L. Brown, I was able to visit what remains of a large series of cooking places near Morgan, on the north bank of the Murray, about two miles east of the town. From the long continuation of broken shelly matter, ashes, and rubbish around these "ovens," the whole must have formed a midden of no mean dimensions previous to its disintegration by the depasturing of sheep, and other causes of a like nature. The escarpment of the river here forms perpendicular cliffs, from sixty to eighty feet high, with here and there a short, broken, and more or less precipitous gully leading down to the water's edge. On the sides of such a gully, and along the cliff top, at about the point mentioned, the surface consists of a large quantity of broken and even comminuted shell-fragments, mixed with dark carbonaceous matter and soil. The deposit occupies a depression on the cliff top, the rising

of the ground beyond tending to form a small and shallow amphitheatre, in which it occurs, perhaps about one to one and a half acres in extent, and ranging at least for 150 yards along the cliff. The shelly *débris* is composed of *Vivipara Hanleyi*, and valves, whole or fragmentary, and at times highly comminuted, of the river *Unio*. The fragments and minute particles into which the shells have been broken, from their nacreous lustre, particularly those of the *Unio*, readily assist in defining the extent of the deposit. Quartz chips may also be picked up in abundance here and there, and have evidently been used. Professor Tate says that no deposit of quartz is known for many miles round. Scattered irregularly over this area, frequently in close proximity to one another, are a number of small, circular ovens, usually about three feet in diameter, seldom more. The stones, about the size of the clenched fist, or rather larger, are firmly bedded in the made soil, but all show, more or less, the traces of fire, possessing a blackened, and in some places a greasy look, whilst in others a semi-fused appearance seems to indicate that they had been subjected to a considerable amount of calorific influence. Black nuclei to the concretionary travertine not unfrequently found on the Murray Cliffs, and about the shores of St. Vincent's Gulf, are ascribed* by Professor Tate to the carbonisation of the fatty matter of animals, which has penetrated into the stone in the process of cooking *à l'aborigine*. Some such process has, no doubt, taken place in the present instance.

The former greater area of this midden is proved by the fact that the cliff edge now cuts across some of the ovens, the action of the river at this particular spot undermining the cliffs, and bring down large masses. No doubt many similar middens might be found on other parts of the river, for on the opposite, or south side, about half-way between Morgan and Fossil Cliff, where the bank is gently inclined, is a deposit of black carbonaceous soil and comminuted shell fragments, extending up from the water's edge, which, although no stones were observed in heaps, represents, I have no doubt, another large midden. How like is the material composing these heaps to the soil of the middens seen on so many of the small promontories jutting out in Middle Harbour, Port Jackson ; the Hawkesbury and its branches ; and other inlets on the east coast. Hardly a point along these waters but has its heap, consisting of carbonaceous matter, charcoal, soil and humus, intermingled in various states of disintegration with cockle, mussel, limpet, and other common shells of the coast, and here and there oysters. Many of these must be very ancient, and have taken years to accumulate. The soil observed on the

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* Trans. Phil. Soc. Adelaide for 1878-79 [1879], p. 115.

Murray is very similar in all but its accompanying species of Mollusca. In these Murray middens it seems to me we have a combination of Sections 2 and 3, *Mirrn-yong* heaps and native ovens previously described. There is the fine carbonaceous soil and comminuted shelly matter of the former, and interspersed in it the small circular cooking places answering to the more isolated native ovens of Central and Western Victoria, and the Murray country, extending some little distance into New South Wales along the course of that river.

The shells found throughout the deposit were clearly used as food, and as regards the Unios this is interesting, for Grey says† that in South-western Australia the natives would "not touch fresh-water mussels," very abundant in the rivers there ; but that in the north-western part of the continent "they form a staple article of food."

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* North-west and West Australia, 1841, II., p. 280.

The Blattariæ of Australia and Polynesia.

By J. G. O. Tepper, F.L.S., &c.

[Read March 7, 1893.]

Introduction.

The Blattariæ form a section of the heterogeneous order of the Orthoptera, and are now usually placed as the second in the series, the Forficulariæ or Earwigs preceding them. They have been so designated by Latreille, Serville, and Fisher, while Burmeister calls them Blattina, Stephen terms them Blattidæ, and Brunner van Wattenwyl in his "Prodromus of European Orthoptera" modifies the term to Blattodea. Popularly they are called *Cockroaches* or *Black Beetles* by the English; *Schaben* by the Germans, and *Kakerlaks* by the French. Palæontologically the cockroaches appertain to the most ancient insects known, impressions of wings, &c., having been found in the Carboniferous (*i.e.*, true coal-bearing) strata of Europe and America. At the present time they are distributed over the whole earth, except the polar and alpine regions, and embrace numerous species arranged by Brunner into eleven families, to which I have added another.

The affinities and differences of the suborders of Orthoptera, as summarised by modern authors, are best indicated by the following synopsis :—

1. Organs of flight in normal position during the larval stage. Legs, inclusive of posterior femora, fitted for running, rarely for burrowing). Ovipositor concealed by a subgenital lamina. All voiceless.
   2. Wings, when present, folded tranversely in the middle of the anterior margin. Tarsi with three joints, arolia none. Cerci corneous, resembling and acting as forceps. *Forficulariæ.*
   2.2. Wings, when present, folded longitudinally from the base. Tarsi five-jointed, with arolia. Cerci soft, more or less distinctly jointed.
      3. Body depressed. Head retracted. Pronotum shield-like; transverse. Legs compressed. Cerci articulate. Insects fitted for swift-running, rarely for burrowing. *Blattariæ.*

3.3. Body elongated. Head free. Pronotum elongate. Legs slender, terete. Cerci articulate or the joints scarcely distinct. Insect fitted for walking.

4. Forelegs raptorial. Cerci distinctly articulate. *Mantodea.*

4.4. Forelegs not raptorial, simple, mostly very much elongated. *Phasmodea.*

1.1. Organs of flight inverted during the larval state. Hind-femora fitted for leaping. Ovipositor free, corneous. Organs of voice and sound-production present. *Acridiodea, Locustodea, Gryllodea.*

General Characteristics.

Form, Size, Colour, &c.—The outline of the body throughout the whole section of the Blattariæ is very uniform, varying only from subhemispherical in *Cassidodes* to compressed elongate-oval, the intermediate grades being the most common. In size the adults vary from less than a quarter of an inch to about three inches in length ; but the extreme sizes are comparatively rare. The colours are usually sombre, mostly some shade of brown, reddish, or yellowish, beside black ; bluish, greenish, and metallic tints, however, occur in the genus *Polyzosteria.* The markings, when defined, are fairly constant as well as the general ground-colour ; the eyes of the living insects are perhaps invariably black, and the variations recorded by Walker are in the case of Australian species scarcely anything else than the discolouration produced by drying, putrescence, &c., or the effects of alcohol and other chemicals. In the larval state the general colour is often much paler and the markings much more definite and decided than with the adults, although exhibiting the same general type.

Habits, Food, &c.—The habits of most species are nocturnal or crepuscular, the remainder—sometimes all the species of large genera—are entirely diurnal, notably of *Apolyta* and *Polyzosteria* as limited by me. The majority appears to be wholly carnivorous, their food consisting of other insects, eggs, larvæ, &c., or their dead bodies, even of their own kind ; the comparative immunity of our native shrubs, &c., from attack of injurious insects is probably owing to a considerable extent to the silent hunting of the formerly very numerous cockroaches, which, like the ants, are not preyed upon by birds, on account of their disagreeable scent. A smaller part, however, are decidedly less particular in their diet, almost omnivorous, such as *Periplaneta orientalis* and *P. americana.* It is this minority which has brought discredit upon the group, by making human habitations their almost ex-

clusive residence, and attacking man's stores. But even these limit themselves in vegetable diet to ripe or prepared fruits, or other vegetable food substances suitably altered by cooking or decay, and I have not met with a single case of living plants having been attacked by them. The greater proportion of species is therefore beneficial to man and Nature generally, notwithstanding their repulsive exterior.

As far as known hitherto the Blattariæ choose as hiding-places during periods of inactivity any dark, secluded spaces, under logs of wood, stones, bark, vegetable debris, or anything offering shelter and protection, and without constructing themselves any burrows or individual homes. The individuals of the genera *Epilampra* and *Oniscosoma*, especially the females, however, are known to bury themselves in loose soil or dust, and their fore tibiæ accordingly exhibit a somewhat modified structure, enabling them to displace the loose particles, being incrassated, and the spines long and stout, though still unmistakably on the normal type. None appear to have been known of truly burrowing habits, like the crickets, until the discovery of a large wingless species near Broken Hill, and subsequently at Renmark, the fore tibiæ of which are sufficiently modified to enable it to burrow in ordinary soil, *e.g.*, red clay. Differing in this direction so much, and correspondingly in other details, I have formed a new family—Geoscapheusidæ—for this singular species.

Owing to their voracity and cannibalistic tendencies, the carnivorous species lead more or less solitary lives, and one meets rarely several together in close proximity; they are not at any time very numerous, on account of the stronger devouring the weaker in lack of other prey, and thus their number is strictly limited by the food supply. It is only such that have developed tastes for amylaceous fare in preference to animal diet which trouble man by invading his habitations in large numbers, and living gregariously and peacefully together, as long as absolute want of food does not force them to extremes, when they do not hesitate to eat each other, nor will they leave the body of a dead comrade undevoured if discovered before quite dry. On the whole cockroaches belong to Nature's best scavengers in wood, field, and garden.

Distribution.—Some of the omnivorous kinds are almost cosmopolitan, being only restricted by the extreme limits of temperature bearable for them. Many species are, however, limited to more or less restricted areas, and disappear with the flora of the regions they inhabit, notably those that are destitute of the power of flight in one or both sexes. Being very shy, swift of motion, and usually endowed with repulsive smell, their habits are difficult to study, and therefore little is known of the vast

majority. It is to be hoped that the present attempt to define and describe our known species may induce others to take up this promising subject.

In the present state of our knowledge, it is impossible to state even an approximate number in respect of defined species. One of the causes is that several authors have been simultaneously and independently at work, with the result that the same species has received different names, which can only be rectified by a thorough revision in Europe by some one with means and leisure to compare the types.

Brunner van Wattenwyl (Nouveau Systeme des Blattaires, 1865), the highest authority on the suborder, describes 378 species in 56 genera, distributed all over the world, many of which occur in two or more continents, but only two species are wholly cosmopolitan, viz., *Periplaneta orientalis* and *P. americana*. The following table will give a general idea of their distribution as known at the date of Brunner's work :—

	Total of Species.	Endemic Species.	Species common to two or more regions.
Europe	18	14	4
Asia and Malay Archipelago	89	62	17
Africa, Madagascar, &c. ...	72	59	13
North America, Mexico, W. India	52	41	11
South and Central America	141	129	12
Australia, New Zealand, and Polynesia	48	38	10
Habitat unknown	7	—	—

The number of endemic species is 343, and 35 are of wide distribution out of the total of 378.

In Walker's British Museum Catalogue (1868) and the Supplement (1869) a much larger number is recorded, but owing to duplication of names, and absence of appreciation of some of the most essential characters, great confusion has resulted, and many of his species are quite uncertain. Since his time some additions have been made by Saussure, Stăl, and Bormans, comprising a moderate number of Australian forms (chiefly from the eastern colonies and islands). Of the later publications of Saussure, recorded by Walker, or of those of the two other writers I have not been able to obtain sight, but expect to get copies in the course of the year, when possible corrections will be duly noted.

In the present paper 193 species are recorded, being comprised in 33 genera and 10 families, of which 1 family, 9 genera, and 55 species are new. The Periplanetidæ are the most numerous with

94 species (or nearly one-half) in 8 genera. The total number of species referred to, unaccompanied by descriptions, is 33, three of which belong to monotypic genera. As only two or three of this species inhabit parts of Australia from which species are described as new by me, scarcely any clashing of my work with that of the older authors is anticipated.

The Characteristic Organs.—The various external organs of the Blattariæ are constructed on so uniform a plan that it appears almost impossible to mistake a cockroach for any other kind of insect, even upon a most cursory inspection ; the systematist has therefore to resort frequently to minute variations in order to insure ready recognition of his species. Fortunately these small differences appear to be remarkably constant, and are therefore the more valuable.

The Head is always more or less retracted, the face flat, the vertex prominent, and the mouth directed rearward, the whole being either entirely concealed under the forepart of the thorax, or only a small portion exposed. The eyes are large, oval or kidney-shaped, and placed more or less obliquely ; during life they appear to be always black. The *ocelli* are mostly only indicated by two pale coloured spots in front, are sometimes wholly absent, and in the *Heterogamidæ* alone are they developed to any extent. Their form, colour, &c., afford sometimes good subsidiary, specific, or varietal distinctions. Such are likewise offered by the face *(frons)*, labrum, clypeus and palpi, occasionally notable in their colour markings, although their structure varies little or irregularly. The *antennæ* are always slender, and mostly filiform or setaceous (sometimes sub-moniliform or ciliate), varying in length from less than half that of the body to more than doubly exceeding it. As in other Orthoptera, the mouth parts are not employable for general classification on account of their great uniformity of structure, and are only occasionally made use of.

The Organs of Flight consist of an anterior pair of more or less leathery or horny elytra, and a posterior pair of much more delicate membraneous wings. One or both pairs may be rudimentary, lobiform or entirely absent, and either perfect in both sexes, or only in the male. The absence or more or less rudimentary state of them are especially prominent in the Australian insects, and favours the localisation and multiplicity of species. They supply most important distinctions.

The Elytra, when present, exhibit a system of veins analogous to that of the other genuine Orthoptera. The *costal* or *mediastinal* vein is very short, usually terminating within the basal-third of length of the fore margin (costa), and is always branchless ; in some genera it shows a more or less tumid keel beneath. The *radial* or *scapulary* vein is free from the base, and emits

branches only towards the costa, except in *Ectobia*, where such are also emitted on the opposite side. The *inframedial* or *ulnary* vein is only separated by a very narrow space at the base from the preceding, which gradually widens during its subsequent course; it mostly separates into an anterior and posterior branch from the start, both branching out towards the border, the inter space being more or less crossed by transverse veinlets. The *dividing* or *anal* vein is the last; it proceeds in a more or less pronounced, generically distinct, curve (often very short), and is unbranched. By it the anal area is bounded, which contains a varying number of straight or reticulating veinlets. The left elytron usually covers the right one, but in rare cases have I observed the reverse. These organs afford most important distinctive characters by the arrangement, curvature, &c., of the veins for the separation of families and genera, and it is the neglect of these which renders the descriptions by Walker and some others so unsatisfactory.

The Wings present homonymous veins, but present a different arrangement in respect of the areas bounded by them, the *anal* vein being straight, dividing the wing nearly in equal halves, and terminating in an angular emargination of the exterior margin, or in some genera cut off by a *triangular area*, which folds fan-like, and in some cases is more or less largely produced beyond the ordinary outline of the border. The *costal* vein turns usually midway towards the fore margin, emitting some straight branches into the same. The *scapulary* vein emits oblique branchlets into the apical half of the costa, and a stouter branch from about the middle towards the apex. In some genera, as *Ectobia* and *Phyllodromia*, it is also connected by short transverse vein with a spurious one proceeding from the border towards the middle without a terminal connection. The *ulnary (inframedial)* vein is mostly separated by a narrow hyaline space from the foregoing, and usually emits more or less numerous branchlets rearward, but in some cases, as in *Ectobia* and *Phyllodromia*, remains simple. The *anal* area contains a number of nearly straight radiating veinlets, more or less connected by transverse reticulations. Important distinctions are often supplied by the wings.

The venation of rudimentary or abbreviated organs of flight is mostly quite distinct in both pairs, and the border is either entire *(Periplaneta)* or jagged *(Panesthia australis)*. When lobiform, the bases only of the principal veins are more or less discernible. The presence of either of these forms, when free, denotes adults; while in the advanced larval stage, and preceding the final moult, both pairs (or one) are made manifest by elongation of the hind-angles of the meso- and meta-notum, and their being more or less plainly discernible, although covered over completely by a thin

contiguous membrane. Adults, when quite wingless, are recognised by the complete development of the genital appendages and the much greater rigidity of their integument.

The *sternal segments* of the thorax are almost concealed by the broad, flat *coxæ*, which are either concolorous, striped darker and paler, or bordered by pale exterior margins.

The Legs are strong, and all fitted for swift running, except in the family *Geoscapheusidæ*, in which the anterior pair is conspicuously modified for burrowing. The *trochanters* are usually large, and the apex, in some cases, produced as a short spine. The *femora* are much compressed, and either all simple or hairy, or provided with two rows of longer or shorter spines on the inner side, or, in a few instances *(Ataxigamia, Gynopeltis)*, the fore femora alone are spined. The character of being thus armed or not is used to divide the Blattariæ into two main divisions. The *tibiæ* are either slender, incrassated, or, in *Geoscapheus*, dilated and flattened anteriorly, and are all armed with four rows of spines, which are more or less developed, but afford no reliable distinctions. The *tarsi* consist of five joints (one sometimes obsolete), are slender and compressed ; each joint has usually a pulvillus or pad beneath, while in some cases an arolium between the two claws is present. The first joint is always the longest, sometimes very long, and its comparative length distinguishes some families or genera.

The Abdomen consists of nine segments and the anal appendages. The first segment is more or less obliterated and amalgamated with the metanotum, especially in the winged species, while in the wingless it appears dorsally as a very narrow extended arc of a circle, projecting from beneath the hindmargin of the metanotum, and does not attain the lateral margin. The following six segments are well developed, their texture, colouring, &c., and the form of their hind angles afford some useful specific distinctions. Tho eighth segment is usually entirely covered by the preceding one, and only denoted laterally by its produced posterior angles. The ninth is still more reduced, and bears the articulated *cerci* and the supra-anal lamina between them. The size, &c., of the former supplies important characters for the distinction of families, genera and species, while the latter is still more important in this respect. On the *ventral side* the males exhibit usually 7—8 zonal segments, the female six ; to the last are appended the subgenital lamina with the styles of the males, and the divided or united valvules of the females ; the genitalia proper of both sexes are quite concealed by these organs, which, in most instances, are very important for classification or identification.

The ova are not deposited singly, but collectively in an egg-

case, which remains attached to the female by a membrane connected with the subgenital valvules or plate until containing the normal number of ova fixed for each species. Although of similar type, specific or generic differences appear to be developed, but our knowledge in this direction is still very meagre. The cases are very elastic, and consist of a double row of cells, each with one egg; they are marked laterally by slight furrows, and the keel above by notches, crenulations, or teeth; the cells open valvularly to permit the escape of the young when hatched, but close again and appear intact.

SYNOPSIS OF FAMILIES.

1. Femora spined.

2. Abdomen of female with last segment large, flat; subgenital lamina obsolete.

3. Supra-anal lamina of both sexes very narrow, transverse. Wings, when developed, with an apical triangular area.

I. Ectobidæ.

3.3. Supra anal lamina more or less produced, triangular, incised, or lobed. Wings without apical triangular area.

II. Phyllodromidæ.

4.4. Supra-anal lamina of male more or less quadrate, of female incised, lobes rotundate or broadly rounded and entire. Cerci scarcely as long as lamina, or very little exceeding the same.

5. Body flat, or moderately convex. Males winged, females wingless. Fore legs gressorial, fore tibiæ clavate, spines in double series. Supra-anal lamina of male more or less quadrate, of female incised, lobes rotundate, or rarely entire. Cerci long, articulate. III. Epilampridæ.

5.5. Body thick, broad. Both sexes wingless. Fore legs fossorial, fore tibiæ flat, spines palmate, in single series. Supra-anal lamina of both sexes broadly rotundate, entire. Cerci very short, joints indistinct. IV. Geoscapheusidæ, fam. nov.

2.2. Abdomen of female with free valvules, or these rarely united by a suture. V. Periplanetidæ.

a. Cerci as long as supra-anal lamina, or scarcely longer. Elytra none, or lobiform. Polyzosterinæ.

b. Cerci much longer than lamina. Elytra perfect or rudimentary, rarely lobiform or absent. Periplanetinæ.

1.1. Femora not spined, or rarely only the anterior ones.

2. Claws with arolia (excepting the females of Heterogamidæ).

3. Forepart of wings rounded, or with plicate apical triangular area. VI. Chorisoneuridæ.

3.3. Forepart of wings rounded, without triangular apical area.

4. Wings with anal area flabellate. Pronotum glabrous (except in some species of *Derocalymma* and *Perisphaeria*.)

5. Abdomen of female with supra-anal lamina quadrate, incised, or entire; hind angles of abdominal segments produced.
VII. Panchloridæ.

5.5. Abdomen of female with supra-anal lamina rotundate, dorsal segments truncate, hind angles not produced.
VIII. Perisphaeridæ.

4.4. Wings with anal area not plicate. Pronotum ciliate.

5. Supra-anal lamina of female rotundate. Extra Australian.
(Chorydidæ).

5.5. Supra-anal lamina of female quadrate, incised.
IX. Heterogamidæ.

2.2. Claws without arolia (except the females of *Heterogamidæ*).

3. Supra-anal lamina of both sexes quadrate, incised. Elytra flat, much exceeding the abdomen (Extra Australian).
(Blaberidæ).

3.3. Supra-anal lamina of both sexes transverse, entire, rotundate. Elytral abbreviated or constricted in the middle, and exceeding the abdomen. X. Panesthidæ.

SYSTEMATIC DESCRIPTIONS.

The following works were principally consulted and availed of to a considerable extent:—

C. Brunner van Wattenwyl, *Systeme des Blattaires*, 1865; Burmeister, *Handbuck der Entomology*, Vol. II., 1838; Walker, *British Museum Catalogue of Blattariæ*, 1868; and *Supplement*, 1869. Also the "Zoological Record," and several minor publications.

I. ECTOBIDÆ.

Body of male elongate, of female dilated. Penultimate joint of the palpi not exceeding the last by more than one half. Wings horny, or leathery, or lobelike, and leaving the scutellum uncovered. Radial vein united at the base with the ulnary, and either emitting branches to the sutural margin, or the veins divide, and if not themselves forked, emit forked branches towards the apex. Wings, when present, with the anal (dividing) vein dichotomous at the apex including a pellucid triangular membrane readily folded between the branches, radiating veins united by a single transverse veinlet. Legs slender, femora spined. Supra-anal lamina of male very narrow, transverse. Subgenital lamina of male oblong triangular, styles rarely provided. Last ventral segment of female ample, or produced, emarginate.

Ectobia, *Westwood.*

Phyllòdromia, Serv.; *Phyllodromica*, Fieber; *Blatta*, &c. (*Br.*, Syst., pl., fig. 1).

Wings perfectly explicate, apical triangular area small. Femora moderately spinose. Supra-anal lamina of both sexes transverse, very narrow. Male without styles. Female with last ventral segments large.

The genus comprises only small-sized insects. The costal vein is short, straight, and cuts off a broad area; the radial and ulnar veins are united (or rather the latter is obsolete), and emit branches on both sides, which is not the case in any other family. The anal vein curves convexly towards the hindmargin, and near it turns outward and meets the margin obliquely. The anal area is comparatively broad, and it and the radial area are provided with transverse veinlets.

Ectobia livida (*Fabr.*), *Brunner*, Syst., 59.

"Body pale. Head brown, vertex ferruginous. Pronotum large, margin of disk slightly reddish. Elytra flat, broad, as long as the abdomen or longer, with brownish dots along the radial vein, sometimes obsolete. Legs pale brownish. Abdomen black, margins and apex pale.

	Male.	Female.
Length of body	9·5 mm.	8 mm.
Length of elytra ...	10 "	6·5 "
Length of pronotum ...	2·5 "	2·8 "
Width of pronotum ...	3·5 "	3·8 "

Habitat.—Europe, Africa (*Brunner*), Australia (*Walker*)."

Ectobia marcida (*Erichson*), *Br.*, Syst., 61.

"Body pale. Disk of pronotum clouded with testaceous. Elytra sparingly veined, interstices brownish. Abdomen piceous, margins pale. Neither measure nor sex recorded.

Habitat.—Tasmania."

Ectobia lucida, *Brunner*, Syst., 62.

"Body chesnut-coloured, shining. Pronotum with lateral margins and median streak scarcely distinct. Elytra with costal area sometimes testaceous, acuminate; radial and ulnar veins *separated at the base*, emitting parallel branches towards the apex, none to sutural margin.

	Male.
Length of body	7 mm.
Length of elytra	8 "
Length of pronotum	1·8 "
Width of pronotum	2·3 "

Habitat.—Australia."

Ectobia apicifera, *Walker* (Blatta), Br. Mus. Cat., 110.

Greyish-white and brown. Head very broad, vertex forming a transverse ridge. Face pale, except a brown semi-elliptical spot between the antennæ and eyes with white margins and median line. Antennæ as long as the body, hairy, pale-greyish. Pronotum wider than long, rounded laterally and in front, straight behind, anterior and lateral margin broadly whitish, former narrowly bordered with black above the eyes, disk brown, with a fine, pale median line and a deep triangular sinus on each side anteriorly. Elytra elongate oval, deep brown, costal and anal margins broadly pale, showing two broad, brown stripes when at rest. Wings pale. Abdomen pale yellowish above, segments bordered dark behind. Underneath pectus and legs pale, abdomen dark with pale margin, last segment and apex partly blackish.

	Male.
Length of body	8 mm.
Length of elytra	6·5 "
Length of pronotum	1·8 "
Width of pronotum	2·6 "

Habitat.—Mount Lofty Range, South Australia. S. A. Museum; one adult male.

An imperfect specimen, referred to this species, has the blackish stripes of the elytra continued over the pronotum, and the black spot of the face more indistinct, but was taken at another place and time. The species, although here recorded under Walker's name, is re-described from the specimens.

II. PHYLLODROMIDÆ.

Wings, when present, without apical triangular area. Elytra and wings perfect or rudimentary; radial vein without posterior branches or only a single branch emitted towards the apex; branches of ulnar vein oblique; anal vein similar to that of preceding family. Abdomen of female with last segment large, without subgenital lamina. Supra-anal lamina of both sexes more or less produced, triangular, incised or lobed. Cerci more than twice the length of the lamina.

Loboptera, *Brunner*, Syst. 79, fig. 5.

Body oblong ovate. Pronotum oblong, or transverse. Elytra abbreviated or lobiform, wings absent. Femora thickly spined, compressed, dilated, also the tibiæ. Abdomen flat in both sexes, sometimes wider in the female than the male. Supra-anal lamina triangularly produced, emarginate in the female. Subgenital lamina of male triangular, obtuse, without styles, or very minute and slender.

LOBOPTERA TRIVITTATA (*Erichson*).

Brunner, Syst., 82; Arch. f. Nat. VIII., 248.

"Yellow. Body with three black stripes, brownish posteriorly, the middle one obliterated anteriorly.

Length of body (sex ?) ... ... 9–12 mm.

Habitat.—Tasmania."

LOBOPTERA HALMATURINA, *sp. nov.*

Pale yellowish. Male oblong, female dilated behind. Two broad piceous stripes from the eyes to the middle of the cerci or rather beyond. Face with a piceous stripe widest between the antennæ, and there nearly severed by a pale transverse line or triangular spot. Pronotum with the pale space in the middle much wider behind and marked by a black spot resembling the conventional "Broad Arrow," and repeated on the disk of the mesonotum, but extending quite across it. Metanotum with a median line much wider behind, sometimes reduced to a triangular dot on the hindmargin and two dots or short transverse bar, also a short, very fine line on either side. Abdomen with a more or less defined median line or stripe of variable form (almost obsolete in some female specimens). Underneath the pectus and coxæ are pale, the latter with two black dots; the legs pale, tibiæ with black dots along the exterior margin and black apices; abdomen piceous to black ventrally.

	Male.	Female.
Length of body	7·5 mm.	8 mm.
Length of pronotum ...	2·3 "	2·5 "
Width of pronotum ...	2·9 "	3·3 "

Habitat.—Near head of Western Cove, Kangaroo Island, captured by myself on *Callitris verrucosa* (Native Cypress-Pine). Six specimens (S.A. Museum).

LOBOPTERA DUODECIMSIGNATA, *sp. nov.*

Flat, fusiform. Brownish or reddish-yellow, dusky. Margins of pronotum, elytra, and meta-notum pale, hyaline; disk pale brownish. Abdomen with posterior segments bordered broadly brownish, lateral margin with six short blackish bars on each side, legs and cerci pale yellowish, posterior part of abdomen darker. Egg-case cylindrical, whitish, with a very fine dark ridge, scarcely serrate.

	Female.
Length of body	10 mm.
Length of pronotum	2·3 "
Width of pronotum	4 "

Habitat.—Vicinity of Adelaide, South Australia. Two females

(S.A. Museum). Under bark of Eucalypts in scrub-lands. The barren female was captured in April; the other, with egg-case undetached, in July.

LOBOPTERA CIRCUMCINCTA, *sp. nov.*

Pale dusky-yellowish, banded with dark-brown, and pale lateral margins. Head blackish-brown, ocelliform spots, and mouth parts pale; also the antennæ. Pronotum with disk and hind-margin brown, enclosing a pale subrhombic spot; foremargin dark-brown, sometimes obliterated. Elytra lobiform, much exceeding the meso-notum; disk brown. Abdomen with anterior segments pale, their hindmargins dark; posterior segments dark, except the last, which has a pale hindmargin. Supra-anal lamina of male very short, rounded; of female acutely triangular, compressed. Cerci long, terete, hirsute. Underside pale dusky-yellowish, legs whitish.

	Male.	Female.
Length of body	8·5 mm.	9 mm.
Length of pronotum ...	2 "	2 "
Width of pronotum ...	3·5 "	4 "

Habitat.—Kangaroo Island (*Tepper*, April, 1884); Riverton (May, 1887); Mount Bryan East (September, 1887). Two males, two females (S.A. Museum).

The males only appear to possess lobiform elytra, the females to be wholly wingless.

LOBOPTERA UNDULIVITTA, *Walk.* (Brit. Mus. Cat., 144).

"Testaceous, fusiform, smooth, shining. Head with two black stripes dilated towards the vertex. Antennæ piceous, base testaceous. Pronotum with two undulating black stripes not extending to foremargin. (Elytra?) Abdomen with two black stripes, apical part black, or almost wholly black. Supra-anal lamina of male bilobed, emarginate, sides deflexed. Cerci long, flat, lanceolate, tawny. Styles distinct.

Length of body (male and female) ... 15 mm.

Habitat.—New Zealand."

This and the following species have been removed from the genera under which they were placed by Walker, on account of their general characters, as apparent by his descriptions, which agree much better with *Loboptera* than any other, notably the striped pronotum and rudimentary wings.

LOBOPTERA MARGINIFERA, *Walk.* (ibid).

"Yellow, fusiform, smooth, shining. Head with a piceous band on the vertex. Pronotum pale, hyaline, yellow, bordered in the disk by two irregular black stripes, and externally by two

yellow lines. Meso- and meta-notum, also abdomen, bordered pale yellow, with two black stripes laterally. Elytra rudimentary, pale yellow, hyaline. Abdomen piceous beneath, angles acute, hyaline. Supra-anal lamina acutely angular laterally.

Length of body (male and female) ... 18 mm.

Habitat.—King George's Sound, West Australia."

LOBOPTERA PLATYSOMA, *Walk.* (ibid, 111).

"Testaceous, elliptical. Head broad, exceeding the pronotum. Antennæ stout, setulose. Pronotum rounded in front, hind-margin straight, sides pellucid. Elytra much shorter than the body, costa much rounded; transverse veinlets few. Wings pellucid, rudimentary.

Var. B. Abdomen with a black patch on each side near the base. Cerci lanceolate, rather long and slender.

	Male.
Length of body	7 mm.
Length of elytra...	2·5 "

Habitat.—West Australia."

TEMNOPTERYX, *Brunner* (Syst. 83, fig. 6).

"Body oblong. Antennæ longer than the body. Pronotum flat, semicircular, leaving the head free. Elytra half the length of the body, truncate, touching in a straight line; scutellum largely exposed, veins not very distinct. Wings as long as the elytra. Tibiæ very spiny, very broad behind, especially with the males. Supra-anal lamina of male transverse, rounded; of female triangular. Cerci eight-jointed."

TEMNOPTERYX OBSCURA, *Saussure.*

Mel. Orth. in Memoirs Soc. Phys. de Genéve, xx., part II., 1870.

Habitat.—India, Samoa. Description not seen.

PARATEMNOPTERYX, *Saussure* (loc. cit.).

Resembles *Temnopteryx*, but the tarsi are not provided with plantuli (arolia).

PARATEMNOPTERYX AUSTRALIS, *Sauss.* (loc. cit.)

Habitat.—Australia. (Zool. Record, Vol. VI., 459, 1870.)

TEMNELYTRA, *gen. nov.* (= truncated elytra).

Body oblong. Antennæ as long as the body. Pronotum flat, semiorbicular. Head free. Elytra subcorneous, semihyaline, extending slightly beyond the metanotum; veins undeveloped, except the main ones, unbranched. Wings none or scale-like.

Femora shortly spined, tibiæ slightly incrassated. Abdomen very flat, nearly alike in both sexes, dorsal segments 8—9. Supra-anal lamina large, almost as long as wide; of the male subtruncate, broadly emarginate, angles rounded; of the female much narrower, subtriangular, arched, triangularly emarginate. Subgenital lamina with long filiform styles. Cerci ten-jointed.

The genus appears to form an intermediate link between *Aphlebia* and *Temnopteryx*, the structure of the elytra appertaining to the former and the general form of body, legs, and genital appendages to the latter. The following synopsis denotes the affinities of this to *Temnopteryx* and the succeeding genus :—

Elytra abbreviated. Wings rudimentary or none.

1. Veins more or less distinct and complete.

2. Elytra truncate, subquadrangular. Veins complete, simple, more or less parallel.

TEMNOPTERYX, *Br.*

2.2. Elytra ovate, rounded. Veins incomplete, sinuate.

BALTA, *gen. nov.*

1.1. Veins almost obsolete, or very indistinct. Elytra truncate, subquadrangular, transparent.

TEMNELYTRA, *gen. nov.*

TEMNELYTRA HARPURI, *sp. nov.*

Pale brownish-yellow. Integument of pro- and meso-notum almost transparent. Pronotum rounded in front, straight behind, angles rounded, margin broad, whitish, hyaline, disk brownish, showing outline of body beneath, and marked by a slender brownish line, the hindmargin overlapping the mesonotum considerably.

Elytra of male quadrilateral, truncate, exceeding the metanotum, with numerous impressed dots, with radial and anal vein distinct, latter terminating apparently in the posterior apical angle, margins pale yellowish, disk pale brownish; female wingless. Abdomen of both sexes pale yellowish, above with a paler margin, an interrupted piceous stripe, including black dots; of male beneath black towards the margin and apex, paler elsewhere; of female quite pale with two dark marginal stripes.

	Male.	Female.	Larva.
Length of body ...	15–17 mm.	15 mm.	10 mm.
Length of elytra ...	4·5 "	— "	— "
Length of pronotum...	5 "	4·5 "	2·7 "
Width of pronotum ...	6 "	5·5 "	4 "

Habitat.—Cygnet River, and Karatta, Kangaroo Island.

Two males, one female, and one larva (S.A. Museum).

The insects are diurnal in habit, and were captured on Acacia

bushes in March in November respectively, and were very swift in their movements. The half-grown larva is almost concolorous. The specific name is given as a slight token of gratitude to and in honour of the late manager of the Karatta Station, Mr. W. Harpur, whose ready and disinterested help and hospitality alone enabled me to examine the south-western part of the island (otherwise uninhabited) for several weeks.

BALTA, *gen. nov.* (Anagram).

Body oblong. Antennæ as long or longer than the body. Pronotum flat, semicircular, wider than long, and not covering the head. Scutellum free. Elytra abbreviated, extending to the fifth or sixth segment of the abdomen, costal margin very much rounded, hindmargin nearly straight, apex obtuse; costal vein indistinct or obsolete; radial vein distinct, sinuous, with five branches (one or two forked); ulnar vein with two branches; remainder wholly absent. Wings very rudimentary or none. Tibiæ compressed, not dilated, with long spines. Supra-anal lamina of male transverse, subtriangular, emarginate and deeply incised, lobes rounded; of female much reduced. Cerci long, ten-jointed.

BALTA EPILAMPROIDES, *sp. nov.*

Size small. Obscurely pale yellowish. Pronotum smooth, lateral margin broad, pellucid; disk with medium line indistinct, a short, oblique streak on each side, and several minute brownish dots. Elytra with the veins and reticulations whitish, interspaces brown. Abdomen of female with six undefined brown stripes, hindmargin of several segments with black dots (Epilampra-like), male paler than female, and scarcely marked. Underside pale, lateral margin of abdomen with blackish spots, or wholly dark. Cerci banded with piceous.

	Male.	Female.
Length of body	8 mm.	8·5–9 mm.
Length of elytra... ...	3·3 "	3·3–3·5 "
Length of pronotum ...	2·3 "	2·3 "
Width of pronotum ...	3·3 "	3·5 "

Habitat.—Kangaroo Island (1886), Murray Scrub (1887). One male, three females (S. A. Museum).

The insect are diurnal, and were captured by me in November on Acacia shrubs.

BALTA DISCALIS, *Walker*, sp., Brit. Mus. Cat., 111.

" Black. Head and pronotum thinly punctured. Base of antennæ, a dot between them, and a patch on each side, extending to the border, yellow. Pronotum with anterior and lateral margin rounded, yellow, hindmargin straight. Elytra tawny,

not exceeding half the length of the abdomen. Underside tawny. Abdomen with a yellow stripe laterally above and below.

Length of body (female) 7–8 mm.

Habitat.—Western Australia."

Phyllodromia, *Serville.*

Br., Syst., 88, figs. 7 and 8; *Blatta*, auctores.

Body elongate. Elytra corneous, incumbent, concealing the scutellum; anal vein long, not much curved, terminating about the middle of the hindmargin; radial vein emitting no branches to the hindmargin, ulnar vein separate at the base, the branches extending longitudinally towards the apex. Wings perfect, ulnar vein undivided, or emitting a few branches to the apex. Abdomen of male lanceolate, with nine dorsal and eight ventral segments; of female with nine dorsal and six ventral. Supra-anal lamina of male triangular, or subsemicircular; of female triangular, obtuse, emarginate. Cerci long, 12-jointed. Subgenital lamina triangular, obtuse, styles none or rudimentary.

This is another of the genera into which the original—now altogether abolished—genus *Blatta* has been distributed, and is of wide extent. A large number of species are recorded by Brunner, Saussure, Walker, &c., but not a single one represented in the collection of the South Australian Museum at present. The species of the last-named author are doubtful, and cannot be correctly placed, owing to his defective descriptions, notwithstanding their apparent fulness, and must remain uncertain until determined by comparison with his types, and redescribed.

Phyllodromia Germanica, *Linné.*

"Brownish testaceous. Head very prominent; face brownish, vertex pale. Pronotum of male oblong, of female transverse, with two brown longitudinal stripes (slightly curved), the space between them reddish testaceous, and distinct from the margin. Elytra concolorous. Wings with ulnar and anal vein entire.

	Male.	Female.
Length of body	13 mm.	11 mm.
Length of elytra ...	11·5 "	11 "
Length of pronotnm ...	3 "	3 "
Width of pronotum ...	3·5 "	4·5 " "

—*Br.*, Syst., 90.

Habitat.—All continents; its occurrence in Australia, however, requires confirmation.

The species has been described as *Blatta Germanica* by most authors, but also as *B. Asiatica*, Pallas; *Ectobius*, Stephen; *Ectobia*, Westwood; *Phyllodromica*, Fieber.

Phyllodromia Australiæ, *Br.* (Syst., 95).

"Testaceous. Head testaceous, with a transverse line; vertex and antennæ black. Pronotum with yellowish fore- and hind-margins; disk brownish, with two dark stripes contiguous in front, space between them of equal width throughout. Wings with the ulnar vein with few branches, all emitted towards the apex. Elytra ferruginous testaceous. Abdomen brownish above, underside streaked brown laterally. Legs testaceous.

	Male.
Length of body	12 mm.
Length of elytra	13 "
Length of pronotum	3·2 "
Width of pronotum	4·2 "

Habitat.—New South Wales."

Phyllodromia spuria, *Brunner* (Syst., 96).

"Brownish ferruginous. Antennæ brownish. Pronotum transverse, truncate in front and behind, with two indistinctly bordered stripes continued along the elytra. Margins of pronotum and elytra broadly hyaline. Legs testaceous. Abdomen border testaceous, and with brown lateral streaks.

	Male.
Length of body	9 mm.
Length of elytra	8 "
Length of pronotum	2·2 "
Width of pronotum	4 "

Habitat.—Fiji Islands."

Phyllodromia femorata, *Brunner* (ibid, 101).

"Rusty yellow. Antennæ blackish at the base, otherwise rusty brown, much longer than the body. Pronotum elliptically transverse, truncate in front and behind; disk yellow, lateral margin hyaline, brown behind, with a very narrow yellow margin. Elytra rusty-yellow, with pale margins. Wings brownish black, fore margin ferruginous, veins black. Femora and tibiæ striped blackish at the apex.

	Male.	Female.
Length of body	10 mm.	11 mm.
Length of elytra ...	12 "	11 "
Length of pronotum ...	3 "	3 "
Width of pronotum ...	4·5 "	4·5 "

Habitat.—New South Wales."

Phyllodromia vitrea, *Brunner* (ibid, 109, fig. 8).

"Pale testaceous. Face rusty. Pronotum with pellucid concolorous disk. Elytra straw-coloured. Wings hyaline, with brown transverse veinlets. Abdomen pale, brownish laterally.

	Male.
Length of body	10 mm.
Length of elytra	10 "
Length of pronotum	3·2 "
Width of pronotum	4·8 "

Habitat.—Fiji Islands; Vera Cruz, South America."

PHYLLODROMIA LATIPENNIS, *Brunner* (ibid).

"Testaceous. Head large, brown. Pronotum broad, truncate in front and behind, pellucid, concolorous. Elytra with radial area broad; anal vein sinuate, reaching the hind margin beyond the middle. Wings with apex obtuse, radial vein with few branchlets, other veins very irregular, transverse veinlets not at all parallel.

	Male.	Female.
Length of body	10 mm.	12 mm.
Length of elytra ...	8·5 "	8 "
Length of pronotum ...	3·5 "	3·8 "
Width of pronotum ...	5 "	5·3 "

Habitat.—New South Wales, New Zealand, Ceylon."

PHYLLODROMIA MUNDICOLA, *Walk.* (Brit. Mus. Cat., 101).

"Fawn-coloured above, yellowish beneath. Head ochreous, antennæ black, base yellowish, longer than the body. Pronotum with white margin and median line. Abdomen with a black stripe along each side, hindmargins of segments white. Elytra much exceeding the abdomen, pellucid, with white costal stripe, veins white in the discoidal and anal areas, transverse veinlets numerous. Wings brownish, as long as the elytra.

	Female.
Length of body	7–8 mm.
Length of elytra	16–17 "

Habitat.—Australia."

PHYLLODROMIA CONJUNCTA, *Walk.* (ibid, 103).

"Testaceous. Antennæ pubescent, a little longer than the body. Pronotum narrowed and truncate in front, straight behind, with a broad, pale, lateral margin. Elytra rounded in front, costal area broad, thickly and irregularly reticulate, veins pale testaceous, transverse veinlets numerous, irregular. Wings pale cinereous, veins paler. Cerci very long, piceous towards the apex. Styles rather long, stout. Legs stout, femora with a few stout spines.

	Male.
Length of body	11–12 mm.
Length of elytra	16–17 "

Habitat.—New Zealand."

The position of this and the following two species is doubtful, and they may have to be removed to some other genus. They certainly appear not to belong to *Ectobia.*

PHYLLODROMIA CONTIGUA, *Walker* (ibid, 228).

"Testaceous. Head with two pale brownish bands, one in front of the vertex, the other lower. Antennæ testaceous. Pronotum elliptical, narrow in front, and slightly truncate, lateral margins broadly pellucid. Elytra membranous (excepting the base), much longer than the abdomen; radial vein forked, transverse veinlets regular. Abdomen with brown spots on each side underneath. Cerci much longer than half the abdomen.

	Female.
Length of body	11 mm.
Length of elytra	14 "

Habitat.—New Guinea."

PHYLLODROMIA SUFFUSA, *Walker* (ibid, 223).

"Ochreous above, pale yellow beneath. Antennæ piceous, base pale yellow. Pronotum truncate in front, transverse, margin broadly pellucid. Elytra rather broad, extending much beyond the abdomen, tapering to the apex; costal margin pellucid, transverse veinlets regular. Wings slightly ochreous, with blackish subcostal stripe for two-thirds of the length from the base. Legs pale yellow. Cerci slender, setose, very long.

	Male.
Length of body	9 mm.
Length of elytra	11 "

Habitat.—New Guinea."

The following references are quoted from "Zoological Record," vols. VI. and IX. :—

PHYLLODROMIA BITAENIATA, *Sauss.* (Mel. Orth., 1870).

Habitat.—Australia.

PHYLLODROMIA SIMILIS, *Saussure* (ibid).

Habitat,—Australia.

PHYLLODROMIA ALBOVITTATA, *Saussure* (ibid, 1873).

Habitat.—New Holland.

APOLYTA, *Brunner* (Syst. 112, fig. 12).

Blatta, Burmeister, Handbk. II., 498, 1839; *Ellipsidium,* Sauss., Hist. Nat. Mex., III., 118.

Body convex, oval when immature, flat in adult. Antennæ as long as, or shorter than, the body; incrassated, hirsute. Pronotum

not covering the head, almost flat, transverse, truncate in front and behind, angles rounded. Scutellum triangular. Elytra with radial vein flexuose, branched; anal vein not curved at the apex. Wings with radial vein forked at the apex; ulnar vein emitting three branches towards the apex. Cerci long, lanceolate.

The genus is entirely restricted to Australia.

The species of this genus are diurnal in habit during all stages moving about the foliage of small trees and shrubs in the bright sunshine of the hottest summer days. They move about very swiftly, fly readily and rapidly, and are very difficult to catch. The larvæ are so different in colour from the adults, that it would be well nigh impossible to assign them rightly for any one not conversant with their habits *in situ*. Moreover, it seems that the larvæ of various species resemble each other much more than the adults.

a. Pronotum pale.

APOLYTA VESTITA, *Burmeister.*

Handb. II., 498; *Br.*, Syst. 112, fig. 10; *Ellipsidium variegatum*, Fabr., *Saussure*, Brit. Mus. Cat. 84.

"Pronotum of the same colour as the body. Antennæ, face, coxæ, femora, tarsi, and abdomen deep black. Vertex, pronotum, elytra, tibiæ, and cerci pale yellowish ferruginous. Apex of elytra brownish. Wings smoky, anterior margin streaked pale yellow. Ventral segments of abdomen bordered white.

	Male.
Length of body	10 mm.
Length of elytra	12 "
Length of pronotum	3·2 "
Width of pronotum	4·5 "

Habitat.—Australia *(Brunner)*; Java *(Burmeister).*"

APOLYTA QUADRIPUNCTATA, *sp. nov.*

Pronotum with broad yellow margin all round; disk pale ferruginous, with two, rather large, oval black spots at the hind angles, and two small round ones in the middle Elytra brownish-orange, veins and veinlets almost white, very distinct, except anal vein, which is deep brown, and irregularly bordered with white; apex blackish. Wings with costal area whitish, remainder blackish, veins pale brownish. Underside as in *A. vestita.* Cerci wholly ferruginous.

	Male.
Length of body	10 mm.
Length of elytra	11 "
Length of pronotum	3 "
Width of pronotum	4 "

Habitat.—Vicinity of Adelaide. One male (S.A. Museum)

APOLYTA HUMERALIS, *sp. nov.*

Head, pronotum, elytra, legs (except coxæ), and cerci pale brownish-yellow, antennæ and coxæ brown, the latter with pale margins. Abdomen paler above, black beneath, segments bordered with white. Elytra concolorous, blackish at the shoulders, veins paler than the membranes.

	Female.
Length of body	10·7 mm.
Length of elytra	11 "
Length of pronotum	2·2 "
Width of pronotum	3·3 "

Habitat.—Northern Territory of South Australia (*J. P. Tepper*). S.A. Museum.

The specimen is somewhat battered, but quite distinct from others, conspicuously so by the dark base of elytra and absence of the dark apex. The wings are brownish.

APOLYTA PALLIDA, *spec. nov.*

Pale brownish-yellow, almost concolorous, including the legs and underside. Margin of pronotum and costal area of elytra much paler, hyaline. Abdomen above banded brownish, beneath more or less dark-coloured towards the apex, or quite pale. Elytra with the veins and veinlets pale. Wings pale dusky-yellowish.

	Male.	Female.
Length of body ...	10·3–10·5 mm.	8·5–11·5 mm.
Length of elytra ...	10 –11 "	8·3– 9·2 "
Length of pronotum	1·8 "	1·5– 1·9 "
Width of pronotum	3 "	2 – 3·2 "

Habitat.—Mt. Lofty Range, Tanunda, Kangaroo Island, South Australia. Three of the females have the egg-cases still attached, one of which is almost completely extruded, and only held by the membranous support. The case is dull-brown, subtrigonal, keel high, 17 rounded teeth visible. Two males and six females (S.A. Museum).

APOLYTA DECORATA, *spec. nov.*

Head, pronotum, elytra, scutellum, post-scutellum, cerci and legs pale brownish-yellow. Pronotum with very pale translucent margins, disk with two to four minute black dots. Wings pellucid. Elytra with white veinlike lines between the veins, which are yellowish. Abdomen black, above with narrow pale lateral margin, ventrally the segments bordered narrowly with white, except the last, which is pale dusky-yellowish in the male, and piceous in the female.

	Male.	Female.
Length of body ...	... 9 mm.	9 mm.
Length of elytra ...	... 8·8 "	8·8 "
Length of pronotum	... 1·6 "	1·4 "
Width of pronotum	... 2·5 "	2·6 "

Nymphs and *larvæ*. Body ovate, convex, deep black, shining. Vertex narrowly pale-yellowish. Pronotum transverse, hind angles subacute, margin pale all round, widest of the hind angles, the colour gradually passing from whitish exteriorly to piceous, or red towards the middle. Mesonotum with hindmargin bordered pale, hind angles much produced, broadly rusty whitish, the part between the lobes often interrupted by fine black striæ. Metanotum with pale hindmargin distinctly interrupted, lateral margin brownish. Abdomen with the first four or five dorsal segments distinctly bordered by narrow, elongated white dots, between the rows a narrow yellow line interrupted in the middle, first segment sometimes pale at the base; fifth or sixth segment with two small yellow dots close to the median line; the next segment unmarked; the last with plain white margin. Cerci ferruginous. Underside and legs black, coxæ and hindmargins of ventral segments bordered white. Spines all pale.

	Nymphs.	Larvæ.
Length of body ...	7·5 mm.	3·3–4·5 mm.
Length of pronotum	1·6 "	1 –1·2 "
Width of pronotum...	3·2 "	1·7–2·5 "
Width of abdomen...	4 "	2 –3 "

Adults, nymphs and larvæ were found simultaneously to frequent bushes during daytime, running about the branches and foliage, trying to escape observation by slipping to the opposite side very swiftly when disturbed, or drop to the ground.

Habitat.—Mount Lofty Range, Tanunda, Sandy Creek, Nuriootpa, Willunga, South Australia; Fraser Range, Western Australia. Three adults, two nymphs, seven larvæ (S. A. Museum).

A small nymph of some minute species was taken near Tanunda, which I am at present unable to assign to any species or even genus by name. It is elongated, black. Pronotum rounded in front, with broad, smoky, hyaline lateral margin, frontal margin and hind angles of disk white. Lobes of meso- and meta-notum smoky, former with two small triangular white spots in front, latter with white base. Abdomen with the second dorsal segment, the hind angles of all segments, and the middle of the sixth white. Underside and legs black, vertex and spines pale.

b. Pronotum with disk blackish.

Apolyta pellucida, *Brunner* (Syst. 114, fig. 10).

Ellipsidium australe, Saussure (Rev., &c., Mag. Zool., 1864).

"Antennæ, disk of pronotum, apex of elytra, legs, and abdomen black. Vertex, margin of pronotum and elytra testaceous, broadly pellucid. Wings anteriorly testaceous, posteriorly smoke-tinted.

	Male.	Female.
Length of body ...	13 mm.	10·5 mm.
Length of elytra ...	14 "	11 "
Length of pronotum ...	4·5 "	3·5 "
Width of pronotum ...	4·5 "	3·5 "

Habitat.—New South Wales."

Apolyta reticulata, *Sauss.* (Brit. Mus. Cat., 84, 85).

Habitat.—Australia. Descriptions not seen of this and the following two species.

Apolyta reticulata, *Saussure* (ibid).

Habitat.—Australia.

Apolyta gracile, *Butler* (Cist. Ent., X., 294).

Habitat.—Queensland.

Apolyta centralis, *Walker* (Brit. Mus. Cat., 120).

"Black, fusiform, smooth. Head with the fore border, the sockets of antennæ and the palpi dark-red. Pronotum reddish, flat, sides black, deflexed, rounded, foremargin truncate, hindmargin almost straight; disk with a broad, very shallow furrow laterally. Elytra red, subcoriaceous, dark cinereous towards the apex, foremargin black for more than half the length from the base, almost straight; anal furrow (!?) slight. Wings dark cinereous. Abdomen with the disk of underside mostly reddish. Cerci lanceolate, moderately long and stout. Legs piceous, knees and tarsi reddish.

	Female.
Length of body	12·5 mm.
Length of elytra	15 "

Habitat.—South Australia."

Thyrsocera, *Burmeister.*

Handb. II., 498; *Br.*, Syst., 115, fig. 11.

"Antennæ often of two colours—blackish and yellow; base hirsute. Pronotum narrow in front, produced behind, rounded, margin deflected. Middle vein of elytra with the basal branches much angulated and emitted towards the apex. Ulnar vein of wings with two or three branches emitted into the apical margin, but none towards the anal vein. Cerci long, lanceolate spathulate."

The genus is remarkable for the smallness of the anal area

The anal vein is very shortly incurved at the hindmargin. Most of the species known are South and Central American, but several occur also in India and the Malay Archipelago.

THYRSOCERA SOROR, *Brunner* (Syst., 120).

"Small. Antennæ of male wholly black, base not dilated Pronotum small, scarcely produced behind, deep black; margin except in front, pale yellow. Elytra wholly piceous. Legs deep black.

	Male.
Length of body	8·5 mm.
Length of elytra	10 "
Length of pronotum	3 "
Width of pronotum	3·3 "

Habitat.—Celebes."

THYRSOCERA INQUINITA, *Walk.* (Brit. Mus. Cat., 103).

"Black, fusiform, nearly flat, smooth. Head yellow. Eyes very far apart. Antennæ piceous, yellow at the back. Pronotum narrow in front, piceous, with two yellow lines united in front, sides broadly whitish and hyaline, much rounded, hind margin slightly rounded. Meso- and meta-notum, also the base of the abdomen, with a yellow stripe. Abdomen with a slender white margin; hind border of ventral segments white. Cerci long, testaceous. Legs testaceous. Elytra piceous, costa white towards the base. Wings blackish cinereous.

	Male.
Length of body	6·3 mm.
Length of elytra	12·5 " (?)

Habitat.—Australia."

This and the following of Walker's species have been removed to this genus provisionally, as the description appears to agree better than with any other.

THYRSOCERA MARGINIFERA, *Walk.* (ibid, 107).

"Black fusiform, smooth. Head and pronotum thinly punctured. Sockets of the antennæ and foremargin testaceous. Antennæ tawny, blackish at the base, setose. Pronotum with a slender yellowish white margin, fore border truncate, setose, hind border very slightly rounded. Elytra coriaceous, veins slightly elevated, forked at the apex; costal area yellowish white, tapering to apex; anal furrow (? vein) very distinct. Wings blackish. Abdomen piceous, with pale testaceous margin. Cerci, pectus and legs pale testaceous.

	Male.
Length of body	8·3 mm.
Length of elytra	16·5 " (span ?)

Habitat.—Australia."

ISCHNOPTERA, *Burmeister.*

Handb. II., 500 ; *Br.*, Syst., 128, fig. 12-13.

" Body of male oblong, of female rounded. Antennæ twice as long as the body. Pronotum small, orbicular, leaving the head free. Elytra pellucid, veins distinct; radial vein emitting parallel branches ; anal vein ending a little before the middle in the hind margin ; axillary veins 6-8. Wings hyaline, ulnar vein emitting pinnate branches towards the anal vein, and others directed towards the apex. Subgenital lamina of male with long styles. Cerci long, twelve-jointed.

These insects are very agile in their movements, and mostly diurnal in habit in Australia. Some species hunt for their prey among the foliage of shrubs, others are found under loose bark, &c., but few, if any, occur in human habitations.. As indicated by the name (thin-winged), the genus is remarkable for the delicate texture of the organs of flight, their colour being chiefly due to that of the veins. The elytra possess apparently no transverse veinlets, but the membrane is greatly strengthened by fenestrate corrugations between the veins, producing a regularly reticulate appearance. The wings, however, have real, although few, transverse veinlets.

(Ischnoptera centralis, Walk. See *Apolyta.)*

ISCHNOPTERA AUSTRALICA, *Brunner* (Syst., 131).

(? *I. marginalis*, Walker, Brit. Mus. Cat. Suppl., 145).

Fulvous ferruginous. Head large, eyes remote. Pronotum almost flat, disk impressed. Wings with foremargin yellowish opaque; apex brownish, radial vein dichotomous, ulnar vein emitting branch "5" into the apical border and branch "3" towards the anal vein.

	Male.
Length of body	20 mm.
Length of elytra	22 "
Length of pronotum	5 "
Width of pronotum	7 "

Habitat.—New South Wales."

ISCHNOPTERA MARGINALIS, *Walker* (Brit. Mus. Cat., 119).

" Testaceous, smooth. Head and pronotum pale red. Head small, face pale yellow; sockets of antennæ whitish, eyes wide apart. Antennæ tawny, setulose, pale yellow at the base. Pronotum pellucid, slightly deflexed, hindmargin slightly rounded. Abdomen blackish yellow beneath, bordered with whitish. Elytra subcinereous, with a white costal stripe tapering to the apex. Wings blackish, costa white, except near apex.

	Male.
Length of body	16 mm.
Length of elytra	20 "

Habitat.—West Australia."

Ischnoptera circumducta, *Walker* (Brit. Mus. Cat. Suppl., 142).

"Testaceous. Head piceous, with sockets of antennæ, foremargin, and palpi testaceous. Eyes wide apart. Antennæ brown, base testaceous. Foremargin of pronotum and sides rounded, hyaline, pale yellow, hindmargin straight, disk with a large blackish ringlet. Elytra coriaceous, costal area pellucid for three-fourths of the length from the base. Wings brownish. Abdomen beneath with brown spots laterally.

	Male.
Length of body	10 mm.
Length of elytra	12·5 "

Habitat.—Australia."

Ischnoptera annulata, *spec. nov.*

Testaceous, apparently resembling the preceding. Head piceous, face a little paler. Antennæ brownish, setaceous, basal joints pale. Pronotum rounded in front, margins pale all round, disk piceous, with a suborbicular or subtrigonal testaceous spot in the middle, hind margin rounded. Elytra pale dusky yellow, radial vein entire before the middle. Wings very pale, costa near apex narrowly brownish, radial vein unbranched, three series of transverse veinlets. Abdomen pale above and below, with blackish spots laterally. Legs pale. Cerci with dark margins.

	Female.
Length of body	11 mm.
Length of elytra	12 "
Length of pronotum	2·3 "
With of pronotum	3 "

Habitat.—Mt. Lofty Range, Kangarilla, South Australia. Captured in April. Two females (S.A. Museum).

Ischnoptera longiuscula, *Walker* (Brit. Mus. Cat. Suppl., 143).

"Testaceous, elongate fusiform. Head with the vertex and face black. Antennæ brownish, testaceous at the base. Pronotum much longer than half its width, margins pellucid. Elytra narrow, semicoriaceous, the anterior longitudinal veins forked, intermediate distinct. Wings pellucid, anal area with white veins. Abdomen long, pale testaceous.

	Male.
Length of body	10 mm.
Length of elytra	12 "

Habitat.—South Australia *(Walker)*."

There are three specimens, viz., one male and two females, in the S.A. Museum, collected by the Elder Exploring Expedition at Cootanoorina, which agree so much with the above description that I refer them provisionally to this species. They are almost concolorous, pale dusky yellow, the head and face piceous, mouth part yellow, a patch at the inner base of the antennæ whitish to pinkish.

	Male.	Female.
Length of body ...	9 mm.	9–10·5 mm.
Length of elytra ...	11 "	11 "
Length of pronotum	2·2 "	2·3 "
Width of pronotum ...	2·8 "	3 "

Ischnoptera patula, *Walker* (ibid, 143).

"Ochraceous, broad, fusiform. Pronotum with foremargin truncate, sides much rounded, hindmargin straight. Legs stout short, femora setose. Elytra semicoriaceous, costa pellucid, some of the veins forked. Wings pellucid, veins white. Abdomen longer than the wings.

	Male.
Length of body	10 mm.
Length of elytra	8 "

Habitat.—New South Wales."

Probably referable to *Apolyta*. The references to the veins, &c., are too vague and unmeaning to decide without inspection of the types.

Ischnoptera latirupta, *Walker* (ibid, 143).

"Ochraceous. Eyes wide apart. Antennæ piceous, testaceous at the base. Pronotum with a fine median line, and a white stripe laterally inside the pellucid margin; hindmargin straight. Femora setose. Elytra slightly coriaceous, with a broad whitish, pellucid, costal stripe, hind part pale testaceous in the left elytra, pellucid in the right. Wings pellucid. Abdomen as long as the wings, with transverse blackish streaks laterally. Cerci moderately long.

	Male.
Length of body	8·5 mm.
Length of elytra	7 "

Habitat.—New South Wales."

The same remarks apply as to the preceding. The insect may belong to *Temnopteryx*, or allied genus.

Ischnoptera anastomosa, *spec. nov.*

Pale dusty-yellowish, concolorous. Head with vertex and middle part of face piceous, margin and mouth-parts pale. Antennæ brownish, each joint with a very fine white ring. Elytra semipellucid, radial vein straight, ulnar vein re-anastomosing for a short distance near the middle with the former, and then again separating. Cerci long, lanceolate, 12 joints.

	Female.
Length of body	12 mm.
Length of elytra	12 "
Length of pronotum	2·5 "
Width of pronotum	3 "

Habitat.—Little Para River, South Australia. Under bark in April. S.A. Museum.

Ischnoptera manicata, *spec nov.*

Pale brownish yellow. Head with a band between the antennæ, and the lateral margins pale, occiput and a broad stripe down the face brownish or blackish. Pronotum subtrigonal, margins and a triangular space in the disk pale dusky yellowish, disk with two broad, oblique, black stripes laterally, widest in front, and narrowly contiguous; also two oblique short black vittæ behind with a small dot between them. Elytra subcoriaceous, radial vein raised towards the base, narrowly piceous, costal margin narrowly brownish. Wings pellucid, blackish in the middle. Legs pale, except a black patch in front of the fore coxæ. Abdomen with ill-defined brownish transverse bands, interrupted regularly, so as to produce five pale narrow longitudinal lines, margin pale. Underside pale, ventral abdominal segments with blackish spots laterally. Cerci twelve-jointed.

	Male.
Length of body	11 mm.
Length of elytra	12 "
Length of pronotum	2·6 "
Width of pronotum	3·5 "

Habitat.—Bordertown, South Australia. S.A. Museum. Under bark of *Eucalyptus rostrata* in January.

Ischnoptera paralella, *spec. nov.*

Brownish yellow. Head pale, except a brownish band between the eyes and an elongated oblique spot opposite the bases of the antennæ. Latter blackish, base pale. Pronotum almost round, with two straight, broad, piceous, parallel stripes widely apart. Elytra concolorous, radial and ulnar veins parallel, distant. Wings pellucid, veins blackish, anterior area with numerous

transverse veinlets. Abdomen dull brownish, margin pale; underside concolorous. Cerci broadly lanceolate, 12-jointed, pale above, with the margin narrowly black towards the apex, and the underside with narrow pale bands. Subgenital lamina of female with a black dot at the apex.

	Female.
Length of body	9 mm.
Length of elytra	10·5 "
Length of pronotum	3 "
Width of pronotum	4 "

Habitat.—Kangaroo Island in the early part of March. Beverley, Western Australia; February (presented by Mr. J. W. O. Tepper). S.A. Museum.

Ischnoptera contraria, *spec. nov.*

Pale dusky yellowish. Head pale, occiput narrowly pale-brownish, face with two larger oval brownish spots between the antennæ, and three minute ones below them. Last joint of palpi brown. Pronotum almost round, margin almost colourless, dark pale-yellow, with two narrow, oblique piceous stripes irregularly sinuate, wide apart in front near the middle of the disk and close behind, in front of each a small brownish figure composed of three short vittæ resembling an arrowhead directed sideways. Elytra concolorous, radial and ulnar veins parallel. Wings pellucid. Abdomen above very pale, below with short, very slender, black lines at the base of the ventral segment, and beyond them with a row of minute dark dots on each side. Cerci pale.

	Male.
Length of body	13 mm.
Length of elytra	20 "
Length of pronotum	3·2 "
Width of pronotum	3·2 "

Habitat.—Murray Bridge, South Australia. On shrubs of *Aster axillaris*, end of November. S.A. Museum.

Ischnoptera obscura, *spec nov.*

Brownish yellow. Head and face deep-brown, except the pale space near the antennæ. Pronotum almost round, fore and lateral margins narrowly pale, pellucid, disk and hindmargin deep-brown. Elytra subcoriaceous, veins brown, membrane pale, pellucid; radial vein separated from ulnar, blackish towards the base, both veins parallel. Wings pale, pellucid. Abdomen pale above, with dusky lateral spots, darker below as well as the legs. Cerci setose, banded brownish.

	Female.
Length of body	10–12 mm.
Length of elytra	11–12 "
Length of pronotum	2– 2·3 "
Width of pronotum	2·5– 3 "

Habitat.—Norwood, South Australia; Kangaroo Island; Lillimur, N.W. Victoria. Captured in March and April. Three specimens, S.A. Museum.

The specimen from Norwood belongs perhaps to *I. anastomosa*, the radial and ulnar veins anastomosing similarly, although the closed cell is much narrower, but the colour markings are different.

Ischnoptera punctuosa, *Walker*.

Brit. Mus. Cat. Suppl., 149.

" Cinereous, fusiform, *very minutely punctured*. Head testaceous, face with a black patch, and three anterior black spots. Antennæ piceous. Pronotum *thinly tuberculate*, *hooded* in front and *extending slightly in front* of the head, rounded before and behind, *sides nearly angular*, a transverse patch on the disk behind. Elytra *with numerous irregular brown dots*, and numerous irregular transverse veinlets. Wings pellucid, with a whitish costal streak, and whitish veins. *Femora unarmed.*

	Female.
Length of body	8 mm.
Length of elytra	10 "

Habitat.—Australia."

Although recording this species under Walker's name here, I do so very doubtfully. On account of the unarmed femora it seems to belong to another section, and, if recognisable, should be removed to the neighborhood of *Panchlora*. It may form the type of a genus, or subgenus *(Pseudo-panchlora)* with the italicised parts of the above description as distinctive characters.

Ischnoptera australis, *Saussure* (Mel. Orth., 27, fig. 17).

Habitat.—Australia.

Ischnoptera fulva, *Saussure* (ibid).

Habitat.—South Australia.

Ischnoptera termitina, *Saussure* (ibid).

Habitat.—Australia. (*Walker*, Brit. Mus. Cat., 119).

Ischnoptera triramosa, *Saussure* (ibid, 2 me. fasc., 1870).

Habitat.—Australia. (See Zool. Record, vol. VI., 459).

III. EPILAMPRIDÆ.

Head depressed. Antennæ setaceous, and shorter than the body, or moderately thick and longer. Pronotum transverse, in winged species produced behind. Elytra coriaceous, horny, or lobiform. Axillary veins, when present, crowded. Wings either perfectly explicate or absent, radial vein much branched, ulnar vein pectinate. Legs long, femora spined. Abdomen in both sexes oval, dorsal segments acute, angular behind. Supra-anal lamina of male quadrate, of female incised with rounded lobes, or entire, broad and round. Cerci shorter than lamina, or scarcely longer. Subgenital lamina of male transverse, with long styles. (The principal distinctive characters are supplied by the supra-anal lamina and the cerci).

PARAPHORASPIS, *Brunner* (ibid, 163, fig. 18).

(*Phlebonotum*, Saussure, Mel. Orth., I., 13, fig. 8),

"Antennæ setaceous, very slender. Pronotum rounded in front, and slightly rounded or tubercular behind. Elytra convex, base not dilated, apex acuminate or rounded, horny, with veins distinct above. Wings rudimentary or perfect, fore part acuminate at the apex, anterior area coriaceous and with few veins, ulnar vein with pennate branches towards the dividing vein, none towards external margin. Legs slender, femora with distant spines. Abdomen of both sexes dilated; of the male with seven, of the female with eight segments. Supra-anal lamina of male transverse, of female triangularly produced, incised in the middle; ventral segments scarcely constricted, the last segment of female triangular, acuminate, somewhat keeled, with two lateral folds. Cerci very short, dilated."

The distinct veins of the convex elytra and the truncate pronotum are the principal generic distinctions. Two species are described; one *P. pallens*, Serv., from Java and Ceylon.

PARAPHORASPIS NOTATA, *Br.* (ibid, 164, fig. 18).

"Reddish testaceous. Pronotum small, deflexed laterally. Elytra acuminate, dusted with black, or concolorous, foremargin brown, bordered with pale yellow, at the base and near the radial vein streaked with pale yellow. Wings with the foremargin of the colour of the body, coriaceous, veins deep-reddish anteriorly, radiating veins brown. Abdomen brown above. Both sexes winged.

	Male.	Female.
Length of body	16 mm.	17·5 mm.
Length of elytra ...	15 "	15 "
Length of pronotum ...	4·5 "	5 "
Width of pronotum ...	5·8 "	7 "

Habitat.—Victoria, Australia; Ceylon."

EPILAMPRA, *Burmeister*.

Handbk., II., 594; *Br.*, Syst., 167.

Antennæ setaceous, of half the length of the body or not much more. Elytra leathery or almost horny, shining, veins scarcely conspicuous; anal area crowded with veins. Wings with radial vein much branched; ulnar vein pectinate inferiorly. Abdomen depressed (in the male, often rather convex in the female), in both sexes ovate, dorsal segments produced behind in acute teeth, last ventral segment of male wholly concealed mostly. Supra-anal lamina of both sexes transverse, bilobed. Subgenital lamina of male transverse, rounded, with long styles. Cerci short, many-jointed. Only the males are winged, the larger females possessing only lobiform elytra, which scarcely exceed the mesonotum. In some of the new species described both sexes appear to be wingless, in which case the lobes of the males are longer, and rounded at the apex, while those of the female are truncate, and some even do not attain to these, yet appear to be quite mature, and both might be placed into separate subgenera. Another remarkable circumstance is, that in the larval stages they are paler and much more promiscuously marked than in the adult, the marks becoming gradually obliterated, the description of the larval forms are therefore necessary for complete recognition. The insects live under bark, stones, logs, dead vegetable debris, or bury themselves in *loose* dust or soil by day. The males fly about just after sunset, or earlier on cloudy, dull days, while the females wander about among the grass or ascend low objects. The former are very swift on foot, but do not readily take to their wings; their flight is rather slow and fluttering, resembling that of some large moths. When struck-at in an attempt of capture, they drop and stop suddenly at the first slight cover found, or bury slightly in the dust, if such be there. This species never frequents houses, and appears to be wholly destitute of odour, especially the males.

EPILAMPRA GRACILIS, *Brunner* (Syst., 170).

E. fornicata, Sauss.; *atomifera*, Walker (Brit. Mus. Cat., 69).

Male.—Dirty brownish grey. Face with a broad, black, band between the eyes, nearly divided by a narrow pale line anteriorly. Pronotum subrhomboidal, anterior and lateral margins pale and unmarked; hindmargin pale with eight to ten short, radially arranged, black vittæ; disk pale, with more or less thickly-scattered, irregular black spots, streaks and minute dots, divided by a narrow pale medium line. Elytra pale, with a black streak in front of the radial vein for about one-third of the length from the base, remainder with numerous small blackish dots scattered along the veins, excepting the pale costa. Wings

with the anterior part pale brownish, veins brown, posterior part pellucid; transverse veinlets distant, regular, whitish. Meso- and meta-notum pale, irregularly and indistinctly spotted. Abdomen with the hindmargin of the dorsal segments broadly brownish, ventral segments pale, with a submarginal row of black spots. Supra-anal lamina pale, subrotundate, hindmargin slightly emarginate. Cerci about one-half longer than the lamina. Styles minute.

Female.—Body broadly ovate, much wider behind, light brown, with crowded, minute granulations all over. Pronotum semi-elliptic, hindmargin slightly rounded, colour and markings similar to male, but darker. Meso- and meta-notum with the disk marked by black patches and dots more or less confluent; hindmargin pale, with about 14 short, black streaks; meta-notum somewhat angularly-produced medially and much laterally behind. Elytra subrotundate, slightly exceeding the mesonotum, with a black streak medially, and some black dots behind. Abdomen dorsally with similar marks as thorax, margin indistinctly pale, hind angles slightly produced. Supra-anal lamina entire, rounded, with minute black spots; ventral segments ochraceous, lateral margin black, a row of black, submarginal spots, hindmargin streaked with black, last segments black, with a pale medium spot, and some others, sometimes more or less obliterated along the base. Cerci very short. Larvæ much paler, markings indistinct.

	Male.	Female.	Larva.
Length of body ...	17–20 mm.	16–21 mm.	15 mm.
Length of elytra ...	17–20 "	3–4·5 "	—
Length of pronotum ...	4–5 "	4–4·5 "	5 "
Width of pronotum ...	6–7 "	9–10 "	9 "
Width of abdomen ...	—	13–15 "	11 "

Habitat.—Vicinity of Adelaide, Burra, Gilbert River, South Australia; September to May. S.A. Museum. Port Adelaide, Sydney, Tasmania (*Brunner*).

The above description has been drawn from 10 males, 3 females, and one larva, varying considerably in size, details of colour, &c.; but all show the disk of the closed elytra pale, and otherwise the various markings pass gradually into each other, so that no distinctions could be set up.

Epilampra notabilis, *Walker* (Brit. Mus. Cat., 202)?

Male.—Deep brownish testaceous, resembling the preceding. Pronotum with very pale margin all round, unmarked, except the black striæ behind; disk black, the middle either paler or not, with a testaceous median line and some variable lateral pale marks. Elytra brown, translucent, costal margin broadly pale

testaceous, unmarked, extending nearly to the apex ; humeral streak deep brown to deep black, narrow near base, broad towards the middle, beyond this interrupted by the pale veins ; remainder of area with numerous small, more or less intensely dark spots, apical part with regular, transverse, whitish veinlets ; left elytron wholly opaque and speckled to the apex, the right one with the apical part unmarked and pellucid where covered, limit oblique sinuous. Wings brown or blackish, costal margin opaque, whitish in the middle ; veins deep brown ; transverse veinlets narrowly whitish. Abdomen obscurely testaceous, more or less distinctly banded above with brown. Underside and legs pale, stigmata and spines black. Supra-anal lamina large, entire or slightly emarginate, pale. The insect appears to be almost black, excepting the pale margin, when at rest.

Female.—Blackish, with pale longitudinal bands, obscured and interrupted by black speckles. Head and abdomen marked as in the male ; hindmargin of all segments with short, black vittæ, hindangles straight or slightly produced. Underside of thorax and the legs pale, ventral abdominal segments reddish, with broad black margin laterally, either entire or interrupted by pale spots, or a broad red space at the apex. Supra-anal lamina broad, rounded, entire or slightly furrowed in the middle. Larvæ and nymphs similar to female, paler, and the markings more distinct than in the adults.

	Male.	Female.	Larva.
Length of body ...	17–20 mm.	16–18 mm.	9–15 mm.
Length of elytra ...	20–24 "	3 "	—
Length of pronotum ...	5 "	5 "	3– 4 "
Width of pronotum ...	6– 7 "	7– 8 "	5– 7 "
Width of abdomen ...	7 "	11–12 "	6– 9 "

Habitat.—Ardrossan, Yorke's Pen., Callington, Sedan, Port Pirie, Bordertown, Kangaroo Island: South Australia ; Lillimur, N.W. Victoria. S.A. Museum. Australia *(Walker*, loc. cit.).

I have re-described the species under Walker's name, as it appears to agree fairly well with his description, incomplete as it is, in order to avoid a new name. It is widely distributed, inhabits dry, hot localities, and has the habits of *E. gracilis*.

Epilampra Fraserensis, *spec. nov.*

Male.—Resembling the last. Pronotum without distinct median line, with two oblique, pale stripes parallel to the lateral margins. Mesonotum and scutellum with a blackish transverse band and dots. Elytra much narrower and longer in proportion, with brown blotches (partly confluent with sinuous bands), especially in the anal area. Abdomen above with broad, blackish, transverse bands notably conspicuous in the last segments, and a

lateral row of conspicuous, oval, blackish spots. Ventrally pale yellowish, a marginal row of small round dots, and a double, submarginal row of elongated, oval, blackish spots. Wings blackish.

	Male.	Larva (Everard R.).
Length of body ...	... 19 mm.	12 mm.
Length of elytra ...	... 24 "	—
Length of pronotum	... 5 "	3·5 "
Width of pronotum	... 7·5 "	6·5 "

Habitat.—Fraser Range, S. W. Australia. Two males *(R. Helms)*, S.A. Museum.

A half-grown female larva from the Everard Range belongs probably to this species also. It differs from those of *E. notabilis* in being much paler, the dark speckles very minute and almost evenly distributed, and not forming blotches or stripes, and the striæ of the hindmargins of the segments being shorter, more numerous, much raised, and dark-coloured. The underside is dusky-yellowish ; the margins broadly blackish, except the extreme edge ; the submarginal spots rather large, a row of dark oval spots medially, and the hindmargins of the segments with short, dark vittæ, the disk being minutely dark speckled.

Epilampra paula, *spec. nov.*

Male.—Whitish-yellowish. Head with a deep black band in front. Pronotum short, broad, much and regularly rounded behind ; margins all whitish, hind border with the usual black vittæ, disk almost uniformly speckled with black. Elytra, with costal area whity-yellowish, broad at the base, tapering to the apex ; a short, black, humeral stripe, remainder brown, with some darker indistinct spots. Pectus, legs, and ventral segments of abdomen pale ; hindmargin of latter very pale, lateral margins with four dusky spots, a submarginal interrupted black or brown stripe, widest posteriorly with an included white dot on some of the segments, and a slender dark median line. Subgenital lamina rather narrow and long, distinctly emarginate. Cerci blackish beneath.

Female.—Clouded reddish-brown, dorsal thoracic segments dusky-yellowish, with black irregular markings, and the typical vittæ on the hindmargin of all segments. Abdomen above with rather large, black, submarginal spots ; ventrally black and brown-speckled laterally, and a slender dark median line.

	Male.	Female Nymph.
Length of body ...	... 14 mm.	17 mm.
Length of elytra	... 16 "	4 "
Length of pronotum	... 3·6 "	4·2 "
Width of pronotum	... 6 "	6 "

Habitat. — Ardrossan, Yorke's Peninsula, and Callington, South Australia. S.A. Museum.

This is the smallest species, and easily recognised by the almost total absence of speckles on the elytra, and the dark median line on the underside of the abdomen. Captured in January and February.

EPILAMPRA INQUINITA, *Stăl.* (*Brunner*, Syst., 177).

Epilampra nudiventris, Saussure (Mel. Orth., 2nd fasc. Zool. Record, vol. VI., 1870).

"Chestnut testaceous. Head brownish-black. Labrum testaceous. Antennæ ferruginous. Pronotum flat, black spotted all over; disk black, lateral margin broadly, fore and hind-margins narrowly, testaceous. Male with the foremargin of elytra testaceous, spotted black; disk ferruginous, marbled with brown; streaks near radial vein black, continued to middle. Apex of wings brownish. Female with the elytra, and still more the wings, abbreviate, rounded.

	Male.	Female.
Length of body	28 mm.	31 mm.
Length of elytra ...	28 "	10·5 "
Length of pronotum ...	7 "	8 "
Width of pronotum ...	9·5 "	11 "

Habitat.—Sydney, New South Wales."

Originally this species included, probably, *E. truncata*, *auriculata*, and *gracilis*. Since the date of Brunner's work, Stăl made this species the type of his genus *Molytria* (Recherches, &c., Blattidæ, Svensky Vetenskap Akad., Stockh., Bihang, II., 1-18; see Zool. Record XII., 487, 1877), but as I have not seen that work, I prefer quoting it under the present designation.

EPILAMPRA TRUNCATA, *Brunner* (Syst., 178).

"Chestnut coloured. Pronotum small, scarcely covering the head, testaceous, disk irregularly brownish, somewhat produced behind, bordered all round (margins incrassated), impressed scabrous dots very fine, mostly scattered. Elytra of the female incumbent, sutural (hind) margin a third shorter than the costal, veins distinct, impressed dots very scabrous, brown dots scattered. Wings rudimentary. Abdomen with rugose marginal folds.

	Female.
Length of body...	19 mm.
Length of elytra, costa...	5·3 "
Length of elytra, hindmargin	3·8 "
Length of pronotum	5·5 "
Width of pronotum	8 "

Habitat.—Sydney, New South Wales."

Epilampra Kerandremii, *Le Guillon.*

Rev. Zool., 292, 1841; *Br.*, Syst., 182.

"Cinereous, speckled with brown. Palpi testaceous. Antennæ brown. Elytra cinereous, with 8—10 brown spots arranged longitudinally in two rows. Legs pale brown. Abdomen above cinereous, with 10 brown spots, space between pale brown, segments on both sides exteriorly with obscure spots.

Length of body	36 mm.
Width of body	14 "

Habitat.—Triton Bay, New Guinea *(Le Guillon).*"

Epilampra dilatata, *Brunner* (Syst., 185).

"Brownish. Head blackish brown. Pronotum broad, brownish testaceous, with black dots. Elytra broad, very obtuse at the apex, of similar colour and markings as the pronotum, clouded with brown towards the apex. Abdomen brown; fourth, fifth, and sixth dorsal and all the ventral segments sometimes with longitudinal brownish streaks.

	Female.
Length of body	32 mm.
Length of elytra	27 "
Length of pronotum	8 "
Width of pronotum	12 "

Habitat.—Australia."

Epilampra laticollis, *Walker* (Brit. Mus. Cat., 203).

"Livid. Face and a broad stripe on the vertex piceous. Antennæ red, piceous towards the base. Pronotum with numerous small brown dots, sides semihyaline, hindmargin almost straight. Elytra semicoriaceous, irregularly speckled brown; at and near base of radial vein some black speckles, branches forked. Wings ashy, veins testaceous, along the costa some brown speckles; anal area pale cinerous, veins whitish. Supra-anal lamina bilobed. Cerci piceous, apex tawny.

	Female?
Length of body	34 mm.
Length of elytra	32 "

Habitat.—Richmond River, New South Wales."

If the sex be rightly stated, this species certainly belongs to another genus, on account of the perfect elytra of the female. Said to resemble *E. notabilis* (male?), but to be much larger, the head more concealed by the pronotum, and the wings longer.

Epilampra aspera, *spec. nov.*

Male.—Pale-grey. Head with a broad brownish-black band at the vertex, a stripe extending on each side to the middle of

the face, leaving a whitish patch between them. Antennæ blackish with delicate-pale rings, base pale. Pronotum anteriorly with three slender, black, curved striæ in the disk on each side; also some irregular black spots and points behind. Elytra narrow, apex rounded, pale-grey; radial vein narrow deep black at the base, paler beyond the middle, with thinly-scattered brownish and blackish speckles along the veins. Wings whitish, pellucid. Abdomen above with pale lateral margin, segments with indistinct dusky bands, and brownish, submarginal vittæ. Legs with the exterior margin narrowly brown. Ventral segments with numerous minute asperous points, whitish; a marginal row of minute black dots, and short, submarginal, deep brown streaks, viz., two obliquely placed to each other on each segment; also two small black spots near the median line on the penultimate segment. Supra-anal lamina pale, pellucid, rather deeply emarginate. Cerci slightly longer, testaceous.

Female.—Pale ochraceous. Head with a piceous band at vertex, one across the middle of the face and one across the labrum, the two latter sometimes united in the middle, or outline indistinct. Antennæ brownish or ferruginous. Dorsal segments asperous or rugose, with numerous raised tubercles and impressed dots, many of the former with recurved sharp points. Pronotum nearly straight behind, with pale margins in front and laterally; disk with indistinct, dusky blotches; hindmargin with the typical raised vittae. Elytra lobiform, subacuminate. Meso- and meta-notum, also abdominal segments, broadly but faintly darker behind. Legs with the coxæ marked with black anteriorily. Abdomen with ventral segments bordered brownish behind; fine longitudinal, interrupted bands, formed by dark blotches; lateral margin broadly blackish, and submarginal band of a round spot and an oblique streak. Supra-anal lamina broad, emarginate, with two dusky, inverted semicircular lines. Subgenital plate with four blackish spots, a medial and two lateral blackish lines converging to apex. Cerci very short, pale.

Larvæ similar to female, much paler, and the longitudinal markings more distinct.

	Male.	Female.	Larvæ.
Length of body ...	17 mm.	18–25 mm.	9 –13 mm
Length of elytra ...	20 "	3– 4 "	—
Length of pronotum...	5 "	4– 5 "	2·5–4 "
Width of pronotum ...	6 "	7– 8 "	4·5–6·6 "

Habitat.—Western Plains, The Peak, Angebuckina *(Driffield)*, Yorke's Peninsula, South Australia; Eyre's Sandpatch near Eucla, Western Australia. S.A. Museum. The species differs from all others by the pale colour, and the asperous dorsal surface.

A young larva from North Queensland, presented by C. French, Esq., is also referred to this species.

Epilampra obscura, *spec. nov.*

Female.—Dull reddish-brown, with numerous, fine, impressed dots, and slightly asperous granulations. Head with a brownish or black band at the vertex, sometimes extending to the middle of the labrum. Antennæ pale brownish, basal joints much paler. Pronotum with fore and lateral margins dirty-yellowish, this colour extending to the elytra and metanotum, hindmargin narrowly pale, interrupted by the raised black vittæ; disk dark-brown, with a narrow reddish median line and paler markings surrounding darker ill-defined spots or dots. Elytra lobiform, short, oval, with a dark medial line and dark impressed dots. Meso- and meta-notum similar to pronotum. Abdomen banded transversely with reddish brown and dusky yellowish, lateral margin darker than the disk, hindmargins with black vittæ. Supra-anal lamina truncate. Ventral segments with larger and smaller black blotches; subgenital lamina black, except some small reddish spots at the base and a reddish streak at the apex.

	Adult Fem.	Fem. larva.
Length of body	23 mm.	13 mm.
Length of elytra	3 "	—
Length of pronotum ...	5 "	3 "
Width of pronotum ...	10 "	7 "
Width of abdomen ...	15 "	10 "

Habitat.—Northern Territory of South Australia (S.A. Museum). Presented by Hon. Dr. W. Magarey. The larva is without the reddish tints.

Epilampra propria, *Walker.*

Blackish, very shining. Head with a black band at vertex and two reddish or blackish ones across the face. Antennæ pale brownish. Pronotum with distinctly scattered impressed dots, fore and lateral margins dirty yellowish, with black dots, border incurved, narrowly brown; disk shiningly black, with a short. lurid median line and 2–4 lurid spots near it; hindmargin alternately black and pale, straight. Elytra of male very long, costa pale yellowish, space before radial vein broadly blackish, remainder dull brown. Wings large, smoky brown, veins black. Elytra of female uniform, apex subtruncate, with a more or less extended black median line and black dots. Coxæ streaked black in front. Abdomen of male pale below except piceous submarginal spots; of female with very narrow pale lateral margin dorsally, each segment with six small, ill-defined, double

dots, forming as many longitudinal lines; hindmargin with the usual vittæ. Ventral segments very broadly black laterally, confluent at the apex of the abdomen, with some pale spots; disk reddish-brown or ferruginous, with a few black spots; of male pale, except the submarginal piceous spots. Supra-anal lamina broad, rounded, middle wrinkled. Cerci slender, pale. Subgenital lamina of male subquadrate, entire, truncate.

	Male	Female.
Length of body	22 mm.	19 mm.
Length of elytra	22 "	3 "
Length of pronotum ...	5 "	5 "
Width of pronotum ...	7·5 "	8–10 "
Width of abdomen ...	— "	10–13 "

Habitat.—Goolwa, Blakiston, Mannum, Kangaroo Island: South Australia. March to April. S.A. Museum.

The black raised vittæ of the hindmargin of the (female) abdominal segments are remarkably long, and in the spaces above small impressed dots, forming two irregular transverse series, are noticed. As this is probably the species described by Walker as *Polyzosteria propria* from Western Australia, Victoria, New South Wales, and Tasmania, I have retained his specific name

Epilampra atra, *spec. nov.*

Black, shining. Elytra of both sexes lobiform. Head pale, vertex and face brownish; sides, antennæ, and mouth parts dirty yellowish. Pronotum with fore and lateral margins narrowly pale dusky yellowish, dotted with brown; disk more or less clouded with indefined lurid marks. Elytra with costa dirty-yellowish, remainder black, a deep furrow along the radial vein. Wings absent. Abdomen shining black, anterior angles very narrowly yellowish; submarginally with an indefined row of lurid spots or bars when young. Underside and legs reddish-brown; ventral abdominal segments partly with black lateral margins and submarginal rows of oblique elongate spots.

	Male.	Female.
Length of body	23 mm.	25–27 mm.
Length of elytra	3 "	4–5 "
Length of pronotum ...	6 "	6 "
Width of pronotum ...	10 "	12 "
Width of abdomen ...	15 "	15 "

Habitat.—Sedan, Murray Scrub, South Australia. S. A. Museum.

The specimens, one male, and two females, were presented by Mr. F. Rothe, who captured them in December, 1885.

The species differs from all others, besides the colour, in the

absence of perfect wings in the male and the usual row of raised vittæ on the hindmargin of the abdominal segments, but this is not considered sufficient for the establishment of a new genus.

Epilampra mediventris, *Saussure* (Rev. Zool., XVI., 321, 1864; Brit. Mus. Cat., 76).

Habitat.—Tasmania.

Epilampra pectinata, *Saussure* (Mel. Orth., II., fasc., 1870).

Habitat.—Australia.

Epilampra irrorata, *Thunberg* (Nov. spec., 4, 76; Fabr. Ent. Syst., II., 8; Brit. Mus. Cat., 231).

Habitat.—Australia.

If Walker's references be correct, the name represents *Deropeltis erythrocephala*, Fabr., *Blatta Capensis*, Thunberg.

The above specific name is not cited by Brunner, although the works mentioned by Walker are quoted, and the pages next to his.

Opisthoplatia, *Brunner* (Syst., 198, fig. 22).

"Body oblong. Pronotum with hindmargin straight, or broadly emarginate. Elytra *and* wings *abbreviated or scale-like.* Abdomen very broad behind; of the male flat, of the female rather convex; hindmargin of all segments rugose, with raised streaks. Cerci very small. Last segment of female triangular, broadly sinuate."

The presence of both elytra and wings is the chief distinctive character. Of the four species known, two occur chiefly in Asia and the Malayan Islands, the others in South America.

Opisthoplatia orientalis, *Burmeister.*

Handbk. II., 482; *Br.*, Syst., 199.

"Red, dorsum black, margin brownish-red. Pronotum with the anterior margin testaceous. Elytra and wings lobiform, acuminate, equal in length, blackish, foremargin red.

	Male.	Female.
Length of body	24 mm.	27–33 mm.
Length of elytra and wings	4·5 "	5·6 "
Length of pronotum ...	7·5 "	8–9 "
Width of pronotum ...	12 "	14–15 "

Habitat.—Australia *(Brit. Mus. Cat.,* 152); India, China, Brazil *(Syst.).*" The home of this species is most likely North Australia, or Queensland; *O. australis*, Burm., inhabits Brazil, not Australia.

IV. GEOSCAPHEUSIDÆ (Earth-diggers). *Fam. nov.*

Antennæ submoniliform, rather stout, scarcely exceeding one-fourth of the length of the body. Pronotum anteriorly arched, truncate, straight behind, wholly concealing the scutellum. Elytra and wings none. Abdomen very broad, oval, dorsal segments acutely angular, two penultimate segments with a retrorse spine on each side, vent covered hermetically by the last segments. Supra-anal lamina of both sexes subtruncate, entire. Cerci very short, thick, apparently inarticulate, partly concealed by a fold of the segment. Subgenital lamina of male subsemicircular; styles none.

The place of this family has already been indicated, see p.

Burrowing is a character well developed among the Gryllidæ (Mole-crickets, &c.), and indicated by a special modification of the forelegs, viz., the short, thick, flat tibiæ, and the long, radiating spines, but I cannot find any references that such habits or modifications have been recorded as occurring among the Blattariæ, and so distinctly exhibited by the individuals of this monotypic family. An approach is made by the EPILAMPRIDÆ, and to a less extent by *Oniscosoma*, a genus of the PANCHLORIDÆ. With these the shortened fore-tibiæ are much incrassated, and armed with long stout spines. The latter are, however, still normally arranged, *i.e.*, in two series, and not differing in this respect from the other groups. In the present instance a great departure from the normal type is noted, viz., the conversion of the forelegs, and especially the tibiæ, into perfect digging implements comparable only with those of the Mole-crickets, the fore-tibiæ being short, broad, and flat, and the long spines arranged digitately in a single series around the margin. A single posterior spinelet denotes the second series. This character, combined with the unique form of the body and the genital appendages have induced me to establish for this species a new genus and family.

GEOSCAPHEUS, *gen. nov.* (*gé*=earth; *scapheus*=digger).

Body broad, oval, thick, coarsely impressed punctate. Head large, rugose. Antennæ moniliform, with joints much thicker than long, about one-fourth of the length of the body, placed in the centre of circular, depressed, whitish areas. Palpi stout, joints subequal. Pronotum transverse; margins slightly incurved, coarsely punctured; foremargin arched over the head; a small, round, depressed area anteriorly, surrounded by a ridge (which is most prominent in front) and separated from the disk by deep furrows; disk tumid in front, finely punctured. Meso- and meta-notum similar, neither excavated nor tumid. Abdomen with eight dorsal segments, very coarsely punctured, hind angles

of the two penultimate segments produced and forming stout, recurving spines. Legs very stout, spines long. Fore coxæ subcylindrical, deeply incised at the apex. Fore femora scarcely as long as the coxæ, incrassated, with three long curved spines near the middle. Fore tibiæ very short, flat, with eight radiating long spines in single series around the margin, besides one or two smaller and movable in the disk. Tarsi very slender, five-jointed, first joint about twice as long as any of the following three ; last longer than the first. Pulvilli very minute or absent. Supra-anal lamina transverse, broad, subquadrilateral, slightly rounded behind in both sexes, narrower in the male. Penultimate segment of male with the hindmargin roundly and broadly emarginate, for the reception of the subgenital lamina. Ventral segments smooth, shining, lateral margins punctured. Styles none.

GEOSCAPHEUS ROBUSTUS, *spec. nov.*

Deep reddish-brown, margins of thoracic segments paler. Mouth parts and palpi black, whitish about the joints. Antennæ blackish. Legs mostly, also the apical part of the spines, very dark, remainder brownish-red. Larvæ smaller, almost wholly black ; dorsal segments of abdomen narrowly dark-brown at the base.

	Male.	Female	Larvæ.
Length of body ...	34 mm.	35 –38 mm.	27 –30 mm.
Length of pronotum...	8 "	8·5– 9 "	6·5– 8 "
Width of pronotum...	17 "	17 –18 "	13 –15 "
Width of abdomen ...	23 "	23 –28 "	19 –20 "

Habitat.—Silverton, New South Wales ; Renmark, South Australia (S.A. Museum).

These singular insects were first brought under my notice by Mr. F. A. Fiveash, who captured a pair at Silverton (in the vicinity of the Broken Hill Mines), and presented them to the S.A. Museum in November, 1886, remarking in his note that they lived in the ground. This was proved by pellicles of red clay still adhering to the legs and body. On November 14, 1891, a small adult female and three male larvæ were sent by Mr. R. H. Q. Simmons from Renmark, the South Australian irrigation colony on the River Murray, near the New South Wales boundary. Nothing is known of their habits, food, &c.

V. PERIPLANETIDÆ.

Abdomen of female with the last ventral segment cleft, forming free valvules. Femora spined.

The family is very numerous in species, and is distributed over the larger part of the surface of the earth, being represented in

Australia by numerous endemic species, besides others of cosmopolitan habitus; indeed it is the largest in Australia.

It may be conveniently divided into two sub-families, viz., A. Polyzosterinæ—(integument more or less corneous and rigid; wings wholly or almost wholly absent)—and B. Periplanetinæ—(integument rather soft and leathery, wings perfect or rudimentary). The first admits again of a natural subdivision into Polyzosteriæ and Platyzosteriæ, characterisable as follows:—

a. Body broadly oval. Ocelliform spots obsolete. Organs of flight entirely absent. Tibiæ stout, spines stout, short. Abdomen dorsally with prominent stigmatic dots. Supra-anal lamina of female broad, rounded, more or less incised, lobes rounded. Cerci short, depressed. Subgenital lamina of male with short, obtuse styles. Polyzosteriæ (*Anamesia*, *Polyzosteria*).

b. Body elongate oval. Ocelliform spots (two) at base of antennæ more or less distinct. Tibiæ compressed, spines long, slender. Abdominal stigmatic dots not distinct dorsally. Supra-anal lamina of female triangular, emarginate. Cerci as long or longer than lamina (blackish). Subgenital lamina of male with slender acuminate styles.
Platyzosteriæ (*Platyzosteria*, *Leptozosteria*, *Pseudolampra*, *Knephasia*).

Anamesia, *gen. nov.* (Intermediary).

Body broad, *subfusiform* (abdomen distinctly wider than thorax), moderately convex; texture coarse. Pronotum semicircular, hindmargin flexuose (concave laterally, convex in the middle); hindangles *rounded*, or slightly angular. Elytra of both sexes obsolete. Legs *long*, *slender*, notably the last pair; tarsi as in *Polyzosteria*. Supra-anal lamina of male *quadrate* or *subquadrate*, hindmargin slightly and broadly emarginate, or rounded. Cerci straight or sublanceolate, shortly acuminate, in both sexes distinctly exceeding the lamina, apex shortly acuminate. Styles rather long, slender, acute.

The generic name refers to the intermediary form of body between *Geoscapheus* and *Polyzosteria*, and to a certain extent (in other characters) between the latter and *Platyzosteria*.

The following synopsis will denote the characteristic differences:—

a. Body subfusiform (abdomen wider than thorax). Hindmargin of pronotum flexuose, angles more or less rounded. Supra-anal lamina of male more or less quadrate, hindmargin concave or very slightly rounded. Cerci straight, distinctly exceeding the lamina, shortly acuminate. Legs long, slender.
Anamesia, *gen. nov.*

a.a. Body elliptical. Hindmargin of pronotum straight, angles acute. Supra-anal lamina of male transverse, hindmargin straight. Cerci lanceolate, scarcely exceeding the lamina. Legs short, more or less incrassated. Polyzosteria, *Burm.*

ANAMESIA LAMBII, *spec. nov.*

Reddish-brown, dorsal surface rough with large, shallow impressed dots, shining. Head brown, ocelliform spots small, indistinct, transversely oval; angles of clypeus pale-brownish, antennæ ferruginous. Pronotum with irregular, broad, low corrugations; hind angles rounded, distinctly elongated. Abdominal segments with coarse impressed dots; angles subacute, not produced; hindmargins of first to fifth segments more or less yellow, of sixth and seventh segment entirely so, eighth with rotundately-produced lobes. Underside and legs reddish to piceous-brown, concolorous. Supra-anal lamina of female subtruncate, margins rounded, serrate; hindmargin yellowish. Cerci with parallel sides, shortly and acutely acuminate, pale-brown.

	Seven Females.
Length of body	29–33 mm.
Length of pronotum	7– 9 "
Width of pronotum	14–16 "
Width of abdomen	18–22 "

Habitat.—Innaminka, Central Australia. S.A. Museum.

The specimens were presented by Mr. W. Lamb, who has at various times enriched the Museum collection with numerous objects of interest procured in a locality which is almost inaccessible for collectors in general, and in grateful acknowledgment the species is named after the donor.

ANAMESIA EASTII, *spec. nov.*

Ochraceous; dorsal surface with large, shallow, rather distant impressed dots, which are dark-brown; shining. Head black above; face variegated paler, a pale ochreous band between the eyes and the sides of the face; antennæ reddish, base blackish. Pronotum pale, with very few dark dots; lateral margin broad, slightly incurved; disk with indistinct elevations and depressions; hindmargin much less flexuose than that of the meso- and meta-notum, both of the latter black at the base in the middle. Abdominal segments narrowly black at the base, dusky along the hindmargin, more or less yellow in the middle, with numerous red or dark round dots scarcely impressed; angles not rounded, those of segments six and seven slightly and acutely produced. Supra-anal lamina of male quadrangular, angles acute, hindmargin broadly emarginate; of female broad, rounded, slightly truncate, and serrate. Cerci slender, scarcely exceeding the lamina, yellow. Subgenital lamina of male quadrate, deeply emarginate, styles long, slender. Underside ferruginous; coxæ pale, striped, with dark red, femora and tibiæ dark purplish.

	Male.	Female.
Length of body	29 mm.	31 mm.
Length of pronotum	9 "	9 "
Width of pronotum	16 "	18 "
Width of abdomen	18 "	23 "

Habitat.—Central Australia. S.A. Museum.

The specimens were collected by Mr. J. J. East, after whom the species has been named, while accompanying Mr. Tietkens in 1888 in his exploring tour.

ANAMESIA LINDSAYI, *spec. nov.*

Reddish-brown. Head brown; ocelliform spots, upper and lower margin of labrum, cheeks, and palpi pale ferruginous, antennæ dusky ferruginous. Pronotum almost smooth, shining, with small, distant punctures; fore and lateral margins very narrowly yellow, hindmargin only yellow in the middle; disk with large rather irregular corrugations, the most notable being a transverse ridge posteriorly, and followed by a deep depression extending into the mesonotum. Meso- and meta-notum similar, hindmargins broadly dark, slightly bordered behind with yellow. Abdominal segments shining, hindmargins of segments, one to five, broadly dark, with a row of small impressed dots; segments six and seven concolorous, rather rough, angles subrotundate, not produced. Supra-anal lamina of male flat, quadrilateral, subrectangular, much shorter than wide, hindmargin slightly convex, sides and base blackish, a lenticular space in disk ferruginous; of the female subquadrangular, arched, dark brown, concolorous, indistinctly serrate. Legs wholly yellowish ochreous, spines alone dark. Abdomen ventrally dark reddish brown, concolorous. Subgenital lamina of male transverse, hindmargin straight, scarcely emarginate; styles slender, exceeding the lamina, red, apex acute, black. Cerci pale reddish, carinate.

	Male.	Female.
Length of body	21 mm.	26 mm.
Length of pronotum ...	5 "	7 "
Width of pronotum ...	12 "	14 "
Width of abdomen ...	14 "	16 "

Habitat.—Fraser Range, South-western Australia. S.A. Museum.

This species is named after Mr. W. Lindsay, the leader of the late Elder Exploring Expedition, and was collected by Mr. R. Helms in May, 1892, who mentions in a note attached that the natives call it "Kumbumberi." The insects, one male and female, resemble *A. Lambii*, but are much smaller, less rugose, and differently marked.

Anamesia Frenchii, *spec. nov.*

Dark chestnut, margin yellow all round, inner limb scallopod; texture coarse. Head with vertex and face reddish brown, a broad band between the antennæ, cheeks and mouth-parts yellowish, antennæ pale reddish. Pronotum rugulose, finely wrinkled, with distant impressed dots; angles rounded, hindmargin rather convex. Meso- and meta-notum similar, angles produced, hindmargin narrowly dark brown. Abdomen rugulose, angles minutely produced, segments with transverse wrinkles and irregular impressed dots; hindmargin of segment six reddish brown; lateral lobes of segment eight large, rotundate, yellow. Underside dark chestnut, legs ochreous yellow. Supra-anal lamina broad, quadrilateral, angles obtuse, rough, blackish, with a yellowish transverse band in middle. Cerci lanceolate, longer than lamina, yellow. Subgenital lamina of male transverse, hindmargin straight, styles pale, scarcely longer, apex black, inserted at the base.

	Male.
Length of body	28 mm.
Length of pronotum	7 "
Width of pronotum	15 "
Width of abdomen	16 "

Habitat.—North Queensland (S.A. Museum). The handsome specimen was presented by C. French, Esq., F.L.S., the enthusiastic and zealous State Entomologist of Victoria, and has been named in his honour.

Polyzosteria, *Burm.*

Handb. II., 482, 1839; *Brunner*, Syt., 203, 1865. *Periplaneta*, Erichson, Wiegm. Arch. VIII., 247, 1847. Walk., Brit., Mus. Cat., 152, 1868.

Body broadly oval to elliptical, convex above. Pronotum semicircular, straight behind, angles acute. Elytra none, wings none. Legs short, rather stout. Tarsi with first joint as long as the two following ones together. Supra-anal lamina of male transverse, straight behind. Cerci smooth, depressed, lanceolate, usually distinctly longer than supra-anal lamina.

The species of the genus are all diurnal in habit so far as known. The greater number inhabit Australia, a few extending to the Malay Archipelago, Mexico, and West Indies. Of the 22 species described by Brunner only four are extra-Australian. Of the 50 recorded by Walker several have been transferred by me to other genera, and many more may also possibly belong elsewhere. Brunner's subgenus *Platyzosteria* I have ventured to raise to full generic rank and added some other new genera, from all of which *Polyzosteria*, as limited by me, differs widely in form and habits.

Polyzosteria limbata, *Burm.* (*Br.*, Syst., 205, fig. 23).

"Body broadly elliptical, blackish, scarcely bronzy. Margin all round very narrowly incrassated, golden yellow, except the foremargin of pronotum. Pronotum with two impressed dots in the disk. Legs uniformly reddish or piceous.

	Male.	Female.
Length of body	38 mm.	39 mm.
Length of pronotum ...	11 "	12 "
Width of pronotum ...	21 "	22 "

Habitat.—New South Wales ("Very common," *Brunner*). Walker records a *P. limbata*, Charp., from Europe (=*Loboptera limbata ?*), *P. limbata*, Burm., and *P. limbata*, Walker, from "Australia," on pp. 152, 154, and 167 of the British Museum Catalogue; the last is possibly the larva of the second.

Polyzosteria obscuroviridis, *spec. nov.*

Elongate elliptical, *dark metallic greenish*, margin all round narrowly yellow. Head with *two minute ocelliform spots* in front, antennæ pale yellow, basal joints dark. Pronotum cucullate in front, finely rugulose laterally and studded with irregular rows of large raised tubercles; disk nearly smooth medially, laterally with ridges and shallow depressions. Meso- and metanotum, also abdominal segments similar, but less distinctly rugose; hind angles acutely produced. Legs brown above, also in front and the longitudinal half of the underside, remainder pale yellowish; tarsal joints pale at the apex and beneath. Pectus and coxæ pale, varied with brown. Ventral segments with a trigonal metallic green spot on each submarginally, those of the abdomen joined by a broad brown band, or a fine line alternately, the penultimate segment piceous. Cerci very flat, obtuse, yellow. Subgenital plate piceous, inner margin of valvules pale.

	Female.
Length of body	43 mm.
Length of pronotum	12 "
Width of pronotum	24 "
Width of abdomen	23 "

Habitat.—Gawler Range, South Australia (S.A. Museum).

A single female was captured in 1884 by Mr. Andrews, one of the Museum collectors. It differs from *P. limbata* by the absence of the two impressed dots on the pronotum, the texture of the dorsal integument, the bicolorous legs, &c., beside size and outline of body.

Polyzosteria iridicolor, *sp. nov.*

Broadly oval. Face, dorsum, stripes of coxæ and the sub-

marginal spots of the ventral segments dark green and coppery iridescent. Antennæ, palpi, narrow margins and the concave hindborder of the dorsal segments dirty yellowish. Body above finely rugulose, near median line with low, irregular, oblique ridge; median line indistinct. Last ventral segment and subgenital valvules transversely wrinkled, deep brown. Supra-anal lamina arched, scarcely incised.

	Female.
Length of body	42 mm.
Length of pronotum	12 "
Width of pronotum	27 "
Width of abdomen	28 "

Habitat.—Gawler Range, South Australia (*Andrews*, Jan., 1884, in S.A. Museum).

The characters chiefly relied on are the great width of the body, the distinctive texture of the dorsal integument, and the narrow, highly arched supra-anal lamina.

POLYZOSTERIA MACULATA, *Brunner* (Syst., 206).

"Elongate elliptical, much depressed, bronzy. Pronotum about the middle of disk golden tinted. Meso- and meta-notum spotted with gold on the foremargins. Coxæ pale yellow, streaked with purplish bronze. Femora, tibiæ, and tarsi with bronzy purple rings. Abdomen of male narrow, of female ovate, ventral segments pale yellow in the disk. Subgenital lamina of male pale yellow.

	Male.	Female.
Length of body	40 mm.	38 mm.
Length of pronotum ...	12·5 "	12 "
Width of pronotum ...	21 "	19 "

Habitat.—Western Australia."

POLYZOSTERIA ÆNEA, *Burm.*

Handbk., II., 483; *Br.*, Syst., 207.

"Elongate elliptical, greenish bronze. Thoracic segments beneath blackish bronze. Legs reddish brown, spines yellow, apex red. Abdomen with dorsal segments shining at the base, ventral with the hindmargin pale yellow. Subgenital lamina of male bronze coloured.

	Male.	Female.
Length of body	56 mm.	60 mm.
Length of pronotum ...	12 "	15 "
Width of pronotum ...	28 "	21 "

Habitat.—New South Wales (*Brunner*), New Holland (*Burm.*)."

Polyrosteria oculata, *spec. nov.*

Uniformally metallic brownish bronze. Dorsum and legs finely rugulose, with numerous larger, distant, obtuse tubercles arranged in three or four irregular rows on each segment, except the last. Antennæ blackish, more than half the length of the body. Pronotum with a small oval, smooth, brightly metallic spot on each side, which is raised and directed obliquely outward anteriorly, behind which is placed a narrow, short, transverse, dark, mettallic, green line. Abdomen with distinct, subcircular, bluish-black stigmatic spots. Pectoral segments beneath broadly sulphur-yellow, laterally with a narrow dark margin and dark disk. Legs brown, yellow about the joints; fore femora with crowded short spines, middle and hind femora with longer distant spines. Supra-anal lamina much produced, broad, deeply emarginate. Cerci broad, flat, subacuminate, of body-colour above and yellow margin, beneath wholly yellow.

	Female.
Length of body...	... 31 mm.
Length of pronotum	... 9·3 "
Width of pronotum	... 19 "
Width of abdomen	... 21 "

Habitat.—Head of South-Western River, Kangaroo Island. S.A. Museum.

A single female was captured by me at the end of February, 1886, although several more were seen. The habit of the species of this genus is entirely diurnal. They hunt solitarily, ascending tall bushes and small trees, where they form conspicuous objects when perched on slender dry twigs, and are visible from considerable distances. When approached, however, they let themselves drop suddenly to the ground and are lost to sight, partly on account of the close agreement of their colouring with that of the ground, and partly through their great nimbleness, which permits them to elude all pursuit usually. They appear to possess no odour. In the specimen of this species the left one of the cerci is only about half as long as the right, although otherwise perfect.

Polyzosteria pubescens, *spec. nov.*

Blackish, partly slightly bronzed. Dorsal surface finely wrinkled, with larger, low, obtuse ridges and tubercles, forming three indistinct rows on each side, besides other rugosities, especially on the thoracic segments, and the whole covered more or less by a dense pubescence of short whitish hairs. Head dark greyish iridescent, punctate, with some yellowish lines or other markings; ocelliform spots indistinctly green or bronze. Mouth

parts and palpi brown varied with yellowish; antennæ pale yellow, basal joints dark brown. Pronotum highly arched in front, foremargin bi-sinuate, narrowly pale yellow, disk rough with several low oblique ridges, hindmargin slightly convex, bordered very narrowly pale yellow, more or less invaded or interrupted by raised, shiningly black striæ, as in all the succeeding segments; lateral margin much incrassated, very narrowly black. Meso- and meta-notum with a prominent oblique ridge midway between margin and middle on each side; median line nearly obsolete. Pectoral segments beneath pale yellow, with numerous dark dots and sinuous lines, margin narrowly pale yellow, and a wider submarginal brown stripe. Coxæ brown, bordered and varied with pale-yellow. Femora brown in front and laterally, remainder yellow. Tibiæ wholly brown, spines pale, with dark tips. Ventral segments of abdomen with pale margins, and broad metallic-green submarginal band; disk of the first four yellow, with one or two brown transverse lines, last two or three wholly dark-brown or black, except the hindmargin. Supra-anal lamina of male subquadrate, scarcely emarginate, narrowly bordered with yellow, and covered with short hair. Subgenital lamina of male black, bordered yellow; styles (also cerci) wholly yellow.

	Male.	Female.	Larvæ.
Length of body ...	30–34 mm.	40 mm.	14–25 mm.
Length of pronotum	10–11 "	11·5 "	4– 9 "
Width of pronotum	20–24 "	25 "	12–22 "
Width of abdomen...	20–22 "	28 "	12–18 "

Habitat.—About the Head of the Great Australian Bight (female, *R. Tate*); Fraser Range, S. Western Australia *(Elder Exploring Expedition)*. S.A. Museum.

The species appears to be unique on account of the body being covered dorsally by a fine dense pubescence only absent along portions of the median regions and the summit of the larger rugosities; in the larval stages it is much less developed than in the adult, or quite absent. The larvæ are also distinguished by the greater distinctness of the black streaks across the pale border of the hindmargins, and the underside being much darker.

Polyzosteria patula, *Walker* (Brit. Mus. Cat., 157).

Broadly elliptical, dull metallic-green; lateral margin of thoracic segments very broad, dull-yellowish; hindmargins of all segments more or less interrupted, dull-yellowish. Dorsal surface finely and irregularly wrinkled, with some larger, rather-deeply impressed excavations on the thoracic segments, the broad margin of these being deeply and distantly punctured. Head of body-

colour, mouth-parts, and area around the bases of the antennæ pale-yellowish; antennæ pale, basal joints darker. Pronotum convex in front, much arched, very narrowly pale-bordered, lateral margin incurved, very narrowly bordered with black exteriorly, disk subtriangularly dark, with a broad semilunar impression in front, and a subtrigonal pit on each side behind; also some smaller lateral impressions; hindmargin rather convex. Abdomen with lateral margins narrowly and uninterruptedly pale, the yellow spots of the hindmargins of segments forming seven interrupted longitudinal bands; hind angles of penultimate segments considerably produced, acute. Underside wholly pale-yellowish; tibiæ with a metallic-green, femora with a brown stripe. Supra-anal lamina of male large, slightly truncate, margin serrated, concolorous. Cerci lanceolate, pale yellow. Styles slender, rather long, acute.

	Male.	Female *(Walker)*.
Length of body	30 mm.	31 mm.
Length of pronotum ...	10 "	—
Width of pronotum... ...	20 "	—

Habitat.—Northern Territory, S.A. *(J. P. Tepper*, 1873, in S.A. Museum); N. Australia *(Walker)*.

This handsome and promiscuously coloured species is here re-described from a male specimen, and agrees fairly well with the description of the female by Walker, who omits (however) many essential characters, which envelopes many of his species in doubt.

Polyzosteria femoralis, *Walker* (Brit. Mus. Cat., 156).

"Blackish aeneous, nearly elliptical, dull. Head metallic green, punctured, sockets of antennæ and foremargin tawny. Palpi testaceous. Antennæ reddish, base piceous. Pronotum nearly semicircular, deeply reflexed laterally and in front, hooded, disk longitudinally rugulose, lateral margin punctured, hind-margin slightly convex, tuberculate. Meso- and meta-notum similar. Abdomen tuberculate, ventrally metallic green, disk piceous, coxæ metallic green, margins testaceous; femora piceous; tibiæ and tarsi pale testaceous. Supra-anal lamina entire, slightly keeled. Cerci short, testaceous. Styles red.

Length of body (male and female) ... 25–27 mm.

Habitat.—West Australia."

Polyzosteria figurata, *Walker* (ibid, 157).

"Ovate, greenish black, dull, densely dotted. Angles of thoracic segments acutely produced. Pronotum rugulose, fore and lateral margins testaceous, much reflected; hindmargin tuberculate. Legs pale testaceous, femora black. Abdomen

with numerous irregular testaceous dots, ventrally with two rows of pale dots. Supra-anal lamina entire. Cerci short, testaceous. Styles black, apex testaceous.

Length of body (female) ... ... 18–21 mm.

Habitat.—West Australia."

Polyzosteria invisa, *Walker* (ibid, 162).

"Elliptical, black, dull, extremely thickly and minutely punctured; beneath metallic green, smooth, more coarsely punctured. Pronotum truncate in front, sides scarcely reflexed, hindmargin slightly undulating. Hind angles of meso- and meta-notum rectangular. Abdomen with a row of impressions on each side, fifth and sixth segment slightly gibbous in the middle, with an impression on each side. Coxæ bordered testaceous. Supra-anal lamina truncate, margins yellow. Cerci fusiform, border and underside yellow. Styles yellow.

Length of body (male) ... ... 30 mm.

Habitat.—Australia."

Polyzosteria Mitchelli, *Angas* (S. Austr., Ill., plate 48, fig. 1).

Broadly to elongate oval, finely wrinkled, dull greyish-blue to greenish-brown; beneath almost uniformly whitish to yellow. Head pale, with a black band uniting the eyes, and continued downwards, the mouth (sometimes reduced or almost obsolete), two dark stripes down the face, often united at the upper end, sometimes joined to the transverse band, or wholly absent. Antennæ of male blackish; of female usually yellow. Pronotum more or less arched in front, semicircular (male) or elliptical (female), lateral margin slightly incrassated, broad, flat; disk with a wider or narrower oblique yellow submarginal stripe, between this and the middle a similar, much narrower and shorter one, and a slight impression or two near the anterior extremity of the latter; hindmargin straight (male) or slightly curved (female), narrowly yellow, hindangles rounded. Meso- and meta-notum similar, hindangles slightly produced, subacute, the inner spots sometimes abbreviated, and with a small brown centre. Abdomen without pale lateral margin (excepting the supra-anal lamina), the inner or submarginal yellow spots continued to, and joining, the pale margin of the lamina (in some varieties contiguous and broad, as those from Eyre's Sandpatch, Eucla, Ooldea; in others much contracted and short as those from Sedan, Fraser Range, or only present to the second or fourth segment); hindmargin pale yellow, equally wide throughout, or wider in the middle, and bordered brownish, as the examples from Ooldea. Supra-anal lamina of male truncate, more or less

angular, shorter than the subgenital; of female much narrower, much arched, slightly emarginate. Cerci lanceolate, blackish blue, apex yellow, exceeding the lamina. Subgenital lamina of male broad, rounded, slightly emarginate; styles rather long, slender, acute. Valvules of female much incrassated. Femora with two dark-brown lines, knees brown, spines small and few. Tibiæ sky-blue to white, spines black, each placed in a round black spot.

	Male.	Female.	Larvæ.
Length of body ...	30 mm.	30–40 mm.	18 –28 mm
Length of pronotum	9 "	10 "	5·5– 8 "
Width of pronotum	18–22 "	18–23 "	13 –18 "
Width of abdomen...	18 "	21–24 "	12 –15 "

Habitat.—Sedan *(F. Rothe)*, about the Head of the Great Australian Bight *(Tate)*: South Australia. Eyre's Sandpacth, near Eucla *(Mrs. Graham)*, Fraser Range, Victoria Desert: Western Australia *(R. Helms*, Elder Exploring Expedition). S.A. Museum. R. Murray Plain *(Angas)*.

This is the most gaudy coloured of all Australian Blatteriæ I have seen, and its adult form is well figured by Angas. The lively colours ornamenting it during life soon fade, and become dull after death, the bright blue changing to whitish or dusky greenish-brown. The markings appear to denote several local varieties, and are most distinct and brightest in the larvæ, as well as the ground-colour. The egg-case is dark-brown, smooth, with a very high obliquely serrated dorsal ridge, the immature specimen in the collection showing 12 teeth so far as exposed. I observed the insects first about October in 1859, in the vicinity of Burra, running and hunting about on the ground, and sheltering themselves when pursued in the dense rigid tufts of *Lepidosperma* and *Xerotes*, from whence they could only be dislodged with conconsiderable difficulty.

The description is drawn up from some 20 odd specimens. Angas attached the name to the figure, but the species appears not to have been diagnosed.

Polyzosteria Bagoti, *spec. nov.*

Broadly oval, dull green, rugose with irregular, low tubercles, margins all round, also the hindmargins of all segments, narrowly dull yellow, with dark dots or transverse striæ. Head iridescent to the bases of the antennæ, beyond shining-brown; antennæ brownish-yellowish, about half the length of the body, fourth basal joint longest. Pronotum arched in front, and the foremargin slightly concave, very broad, somewhat convex behind. Meso- and meta-notum much broader laterally than in the middle, hindangles produced, subrotundate. Thorax longer than ab-

domen, ventrally its margin very broad, pale-yellowish, with numerous flexuose black lines and black dots. Legs and abdomen beneath brownish, varied with blackish bands, patches, and lines. Supra-anal lamina of male broad, short, distinctly emarginate. Cerci broad, ovate, scarcely longer than lamina. Subgenital lamina of male pale, subquadrate, entire; styles lanceolate, almost as long as the cerci.

	Male.
Length of body	14 –16·5 mm.
Length of thorax	9 –10 "
Length of abdomen	6·5– 7·5 "
Length of pronotum	4·5– 5 "
Width of pronotum	13 –13·5 "
Width of abdomen...	12 –13 "

Habitat.—Port Augusta.

Two males of this small but remarkable species were presented to the S.A. Museum by Mr. C. M. Bagot, who captured them. Besides the colour, the shortness of the abdomen and the almost microscopical smallness of the femoral spines are unusual.

Polyzosteria reflexa, *Brunner* (Syst., 208).

(*P. femoralis*, Walker !).

"Elliptical in front, semiorbicular behind, bronze-coloured. Body scabrous above, verrucose. Pronotum with the fore and lateral margins broad and acutely reflexed, golden-yellow exteriorly. Femora red, tibiæ yellow, with black spines. Ventral segments of abdomen dark-brown, concolorous, bronzed.

	Male.	Female.
Length of body	25 mm.	30 mm.
Length of pronotum	9 "	11 "
Width of pronotum	15 "	18 "

Habitat.—Western Australia."

There are four specimens in the collection of the S.A. Museum (locality unrecorded) which agree fairly with the general character denoted in Brunner's and Walker's descriptions, but neither is precise enough to settle the point. I append, therefore, a fuller one based on my specimens, supplementing the former.

Metallic green (male), dull blackish (female), or pale yellowish (larvæ), margins narrowly yellowish; dorsal surface finely scabrous with scattered, elevated, smooth, shining, pale brown or yellowish tubercles and ridges, the latter existing chiefly on the pronotum, less on the meso- and meta-notum, forming various patterns difficult to describe. The abdominal segments have a row of tubercles along the hindmargin and one or more in the middle, the bases in the larvæ being marked with a narrow black or metallic green band. The hindmargins of the male are pale, of the female dark,

the tips of the tubercles black in both sexes. The supra-anal lamina of the male is broad, subquadrate, the hindmargin slightly concave ; of the female rounded and entire. Cerci very short, rather broad, yellow. Coxæ and femora of female reddish brown, concolorous ; coxæ of the male metallic green, femora and tibiæ brown with golden borders.

	Male.	Female.	Larvæ.
Length of body ...	22 mm.	25 mm.	15 mm.

Polyzosteria nobilis, *Brunner* (ibid, 209).

" Rather small, oblong. Bronze-coloured, scabrous verrucose. Pronotum in front and laterally reflexed, external margin black. Legs wholly brownish red. Ventral segments of abdomen testaceous, base brownish bronze.

	Male.	Female.
Length of body	26 mm.	30 mm.
Length of pronotum ...	8·5 "	9 "
Width of pronotum ...	13·5 "	15 "

Habitat.—Western Australia."

Polyzosteria subnobilis, *spec. nov.*

Elongate oval. Very dark bronze above. Head bright bronze, deeply impressed, dotted, with a yellow stripe on each side. Pronotum with a broad reflexed margin in front and laterally, finely and irregularly wrinkled, arched in front and with an acute point ; disk deeply sculptured, with a rather deep sinuous transverse furrow anteriorly, the extremities of which (and some other dots) bright metallic bluish green ; hindmargin straight, angles produced, acute. Meso- and meta-notum similar in texture, nearly equally wide. Abdomen finely punctured, segments one to six with a wider or narrower, smooth, band at the base on each side, acute at each end, and separated or scarcely joined in the middle, in segment seven the band is broadest and contiguous ; two penultimate segments laterally much produced, acute. Supra-anal lamina truncate, base broad, hindmargin much contracted, sides straight. Cerci dark-brown, stout, apex pale. Pectus with very broad, deep metallic green margin, disk pale yellowish, with a lateral triangular blackish green patch on meso- and meta-sternum. Coxæ pale yellowish, with one or two metallic green stripes at the base. Femora brown, or greenish, with few, short, pale spines. Tibiæ blackish brown ; spines pale yellowish, tips black. Tarsi blackish above, brownish below, pulvilli large. Ventral segments of abdomen pale yellowish, stigmatic spots black, a narrow green band at the base, hindmargin narrowly greenish, with some dark dots ; last segment deeply emarginate below the cerci, brown, except margin, also the valvules.

	Female.
Length of body	25 mm.
Length of pronotum	6 "
Width of pronotum	13 "

Habitat.—Karatta (near mouth of Stunsailboom River), south-west coast of Kangaroo Island. S.A. Museum.

This species apparently resembles the preceding, but independent of smaller size, the pale coxæ and the smooth semilunar band of the dorsal segments induce me to consider it of specific rank, the above being such conspicuous characters, that Brunner would certainly not have overlooked or failed to record them if they had deen present in his specimens. The insects hunt on Eucalyptus shrubs, in bright, hot sunshine, and are very rapid in their movements.

Polyzosteria subverrucosa, *White* (Grey's Journal, 2nd. Exp. II., 467 ; Brit. Mus. Cat.; 155).

"Apterous, oval, thorax in front semicircular, shrouding the head ; posterior angles sharp, rounded behind, the frontal edge bent slightly back, and yellowish ; the upper surface brown, rather obscure, the surface irregularly raised ; below deep shining pitchy brown. Abdomen yellowish, above sprinkled with dark-brown, the edges of each segment with several small wartlike prominences, the two first segments being also shagreened at the sides ; beneath pitchy brown, segments at the base black, with green reflections ; the femora are pitchy brown, the tibiæ pale yellowish, with black spines ; the tarsi of a deep yellow ; head dark brown, the trophi and a narrow line on the cheeks yellowish ; antennæ somewhat ferruginous. A large apterous species.

Habitat.—King George's Sound, West Australia *(Capt. G. Grey)*."

I have not yet seen the species, of which the above is the unabridged original description, but it appears to belong to this genus without doubt.

The following species, except one, are all described by Saussure in the "*Revue et Magazine de Zoologie*," October, 1864, and are recorded from "Australia" (most likely the coasts of Eastern Australia). Although inserted here, they may all or the greater number have to be removed to *Platyzosteria*.

Polyzosteria bicolor, *Saussure* (Rev. Zool., XVI., 307, Australia.

Polyzosteria pulchella, *Sauss.* (ibid, 308), Australia.
" biglumis, *Sauss.* (ibid, 305), Australia.
" consobrina, *Sauss.* (ibid, 306), Australia.
" analis, *Sauss.* (ibid, 305), Australia.
" (Zonioploca) alutacea, *Stål.* (Rech. Syst. Blatt.

in R. Svenska Vetanskap Academicus Handl., Stockholm, Bihang II., No. 13).

Habitat.—Australia.

Polyzosteria Sedilloti, *Borm.* (Faune Orth. d'Iles Hawai).
" variolosa, *Borm.* (ibid).

Habitat.—New Caledonia.

The last two species were published by A. de Bormans in the "*Annali del Museo Civico di Storia Naturali de Genova*, vol. XVIII., 1883, but I have not seen the descriptions.

Platyzosteria, *Brunner* (Syst., 204).

Body elongate oval, flat, rather thick; integument more or less leathery (not rigid) during life. Supra-anal lamina of male quadrate or subquadrate, angular or rounded, truncate or concave behind; of female subtriangular or rotundate, emarginate, colour mostly black or brown. Habit more or less nocturnal.

Platyzosteria melanaria, *Erichson* (Wiegm. Arch., VIII., 247; *Br.*, Syst., 210).

"Shiningly black. Antennæ and tarsi blackish, coxæ with red margins posteriorly. Supra-anal lamina in both sexes triangularly rotundate, emarginate, serrate, and ciliate.

	Male.	Female.
Length of body	29 mm.	33 mm.
Length of pronotum ...	8 "	8·5 "
Width of pronotum ...	11·5 "	12 "

Habitat.—New South Wales; Tasmania."

The only species before me which fairly agrees with the above (scanty) description, and which I therefore refer to it, exhibits the following differences or additional characters. Lateral margins of thoracic segments, also the legs, more or less deeply brown, pulvilli whitish. Antennæ long, slender, pale brownish or rarely blackish, base surrounded by a circular white area. Abdominal segments with the hind angles acutely produced, lateral margin of the last two finely serrated. Supra-anal lamina of male broad, rotundate, slightly emarginate, scarcely serrate; of female narrow, longer than wide, deeply emarginate, and the lateral margin conspicuously serrate. Cerci of male lanceolate, a little longer than the lamina, black, apex pale; of female much shorter. Subgenital lamina of male quadrate, styles prominent, slender, acute.

	Male.	Female.
Length of body ...	32–38 mm.	29–38 mm.
Length of pronotum	7– 8 "	7– 8 "
Width of pronotum...	12–15 "	12–15 "

Habitat.—Adelaide, Gilbert River, Sedan, Kangaroo Island: South Australia; Lillimur, S.W. Victoria. S.A. Museum, 13 specimens.

PLATYZOSTERIA ARMATA, *spec. nov.*

Deep shining brown, finely impressed punctate. Head, antennæ, and legs reddish brown, labrum and palpi black, apex pale, ocelliform spots small, subtrigonal. Pronotum with shallow depressions forming a faint, equal-sided, triangular pit behind. Abdomen with hind angles of segments *very acutely produced as spines*, lateral margin of last segment conspicuously dentate; ventral segments scabrous-rugose at the margin, black; disk smooth, finely punctate, varied with reddish brown. Supra-anal lamina of male triangular, margin straight, entire, deeply and narrowly incised at the apex, the *lobes forming long acute spines*, with a small spine externally at the base; of the female with the margin somewhat rounded, prominently dentate, apex emarginate, the *lobes forming short broad spines*. Cerci obliquely lanceolate, base broad, apex acute, pale. Subgenital lamina of male quadrate, emarginate, scabrous, pale-yellowish at the base; styles long, acute, spine-like; subgenital plate of female acutely triangular, very scabrous, black.

	Male.	Female.
Length of body ...	36 mm.	32--35 mm.
Length of pronotum ...	7 "	8 "
Width of pronotum ...	14 "	14--15 "
Width of mesonotum ...	17 "	16--17 "
Width of abdomen ...	19 "	17--18 "

Habitat.—Fraser Range, Western Australia (*R. Helms*, Elder Exploring Expedition, October, 1891). S.A. Museum.

This large and remarkable species is easily recognisable by the spine-like lateral elongations of the abdominal segments and the spine-like lobes of the supra-anal lamina.

PLATYZOSTERIA RUFOFUSCA, *spec. nov.*

Reddish-brown, coxæ and femora paler reddish, tarsi yellowish. ochraceous. Surface laterally fine scabrous, disk almost smooth. Thoracic segments, with the hind segments much rounded-Abdomen with hind angles shortly produced, sharply angular, lateral margin of last segment slightly and distantly serrate, hind angles of last segments much produced, broad, acute; ventral margin blackish-brown, rather scabrous, disk nearly smooth, reddish to piceous. Supra-anal lamina of female as wide as long, rounded, shortly dentate, not or scarcely emarginate, narrowly keeled. Subgenital valvules black, nearly smooth, subtriangular, obtuse.

	Female.
Length of body	32 mm.
Length of pronotum	8 "
Width of pronotum	13 "
Width of mesonotum	16 "
Width of abdomen	17 "

Habitat.—Gilbert River, S. Australia (*L. Molineux*, May, 1887). S.A. Museum.

This species resembles the preceding in stature and colour, but is much smoother, the hindangles of the abdominal segments much less produced, and the lamina of quite a different form.

PLATYZOSTERIA (*Peripl.*) ATRATA, *Erichson* (Wiegm. Arch., VIII., 247 ; *Br.*, Syst., 219).

"Black, shining. Antennæ, margin of pronotum, tibiæ at the apex and the tarsi red, coxæ posteriorly with a yellow border.

	Male.	Female.
Length of body	17 mm.	23 mm.
Length of pronotum ...	5 "	6·5 "
Width of pronotum ...	9 "	9·5 "

Habitat.—New South Wales ; Tasmania."

PLATYZOSTERIA (*Periplaneta*) ATERRIMA, *Erichs.* (ibid).

" Deep black, shining, much depressed. Antennæ ferruginous. Supra-anal lamina of male with hindmargin straight. 'Resembles the preceding species, but differs in dimension' (*Brunner*).

	Male.
Length of body	12·5 mm.
Length of pronotum	4 "
Width of pronotum	6 "

Habitat.—Tasmania."

PLATYZOSTERIA PUNCTATA, *Brunner* (Syst., 211).

"Small, slender, deep black. Body wholly covered with impressed distant spots. Abdomen with the last segments and the lamina scabrous.

	Male.
Length of body	12·2 mm.
Length of pronotum	3 "
Width of pronotum	4·8 "

Habitat.—Eyre's Sandpatch, near Eucla, Western Australia (*Mrs. Graham*) ; S.A. Museum. New South Wales (*Brunner*).

The single male from the former locality, which I refer to this species, has lost the antennæ, but agrees well in dimensions, &c., with the description. It is, however, less dotted, the

scabrous part more extended, dull black above and below, and the mouth parts (trophi) and legs deep chestnut-brown.

PLATYZOSTERIA PSEUDATRATA, *spec. nov.*

Deep black, shining. Thoracic segments with distant impressed dots. Hindangles of mesonotum slightly, of metanotum considerably, produced, rounded; of the abdominal segments, especially the hindmost, acutely produced, hindmargins finely tuberculate. Legs with the coxæ black, narrowly bordered with yellow; trochanters and femora chestnut-brown; tibiæ and tarsi black, the latter white below. Supra-anal lamina of male subquadrate, dentate, deeply and roundedly emarginate. Cerci wholly black, slightly longer than the lamina. Ventral abdominal segments shining deep-black. Subgenital lamina of male with hindmargin straight, entire, black; styles black.

	Male.
Length of body...	23 mm.
Length of pronotum	6·5 "
Width of pronotum	12 "
Width of abdomen	14 "

Habitat.—Central Australia (from the collection of the late *Fraser S. Crawford).* S.A. Museum.

The species appears to resemble *Periplaneta fortipes*, Walker, but differs in the distantly punctured thorax, &c., and from *P. atrata*, Er., in the absence of the red colour of the legs, &c.

PLATYZOSTERIA ALBOMARGINATA, *Br.* (Syst. 212).

" Black. Antennæ blackish at the lower third, remainder ferruginous. Thoracic segments with white margins. Legs and supra-anal lamina reddish.

	Male. (larvæ?)
Length of body	18 mm.
Length of pronotum	5 "
Width of pronotum	6·5 "

Habitat.—Sydney, New South Wales."

There are one male and two female specimens, undoubtedly adults, in the collection of the S.A. Museum, which I am inclined to refer to this species, but the above description is too meagre for sure identification; a more detailed description is therefore given below, and the varietal name *brunnea* adopted. If the characters should be proved sufficient to separate the two, the latter name might become the specific term

P. ALBOMARGINATA, *Var.* BRUNNEA, *var. nov.*

Black, varied with deep brown in the disk. Antennæ pale ferruginous, basal part black. Pronotum with foremargin brown,

lateral margin (as well as that of meso- and meta-notum) white or pale yellow above and below, narrowly bordered exteriorly with black, very finely rugulose. Wingless. Coxæ and femora blackish brown, tibiæ and tarsi red. Abdomen smooth, lateral margin (incl. of lamina) reddish brown ; in the male submarginal ridgelike incrassated, hindangles acutely produced, spinelike (especially of the hindmost segments), dentate ; in the female scarcely incrassated, hindangles much less produced, lateral margin of last segment finely carinate, entire. Supra-anal lamina of male narrow, subtrigonal, apex keeled and emarginate with two large spines ; of female more rounded, slightly dentate towards the apex, deeply and roundly emarginate. Cerci of male narrow, subterete, much shorter than the lamina, and scarcely exceeding the lateral spines ; of female lanceolate, and a little longer. Valvules imperfectly free.

	Male.	Female.
Length of body ...	23 mm.	25–28 mm.
Length of pronotum ...	6 "	6– 7 "
Width of pronotum ...	10 "	10–12 "
Width of abdomen ...	12·5 "	12–13 "

It is with some diffidence that I insert this species here, as it resembles my genus *Drymaplaneta* very much in aspect, notably the pale margin of the thoracic segments, but the cerci being short in this species, and long in all the species of the above genus, induced me to retain it here provisionally. In fact, it seems one of those confusing intermediary forms that bother the systematist and delight the biologist.

Habitat.—Gilbert River *(L. Molineux)* ; Ravine des Casoars, Kangaroo Island *(Tepper)*: S. Australia; Barrow Range, Central Australia *(R. Helms*, Elder Exploring Expedition). S. A. Museum.

Platyzosteria subaptera, *Brunner* (Syst., 212).

" Black, rather dull, depressed (female ; male convex). Elytra lobiform, only partly free. Penultimate segments of abdomen and supra-anal lamina rugose, margins of both serrulate. Subgenital lamina of male transverse, margin straight, angles acute, styles inserted beside the angles." (Subgenital valvules of female distinctly emarginate at the apex.)

	Male.	Female.
Length of body ...	16–19 mm.	17–21 mm.
Length of pronotum	4– 5 "	4– 5 "
Width of pronotum	6·5–8 "	7– 8·5 "
Width of abdomen	—	9–11 "

Habitat.—Blakiston, Victor Harbour, Monarto : South Australia (S.A. Museum) ; Port Adelaide and Melbourne *(Brunner)*.

PLATYZOSTERIA AVOCAENSIS, *spec. nov.*

Chestnut-brown, shining, with minute impressed dots over the whole dorsal surface, interspersed distantly with larger ones on the thoracic segments. Antennæ blackish at the base, gradually paler towards the apex. Legs dark-brown, long; tibiæ and tarsi black, claws reddish; femora with numerous, rather-long spines. Abdomen smooth in the disk, margins and the two last segments rugulose, hindmargins of all regularly and minutely tuberculate; hindangles, especially of the hinder segments, produced into acute spines, those of the last denticulate laterally. Supra-anal lamina of female very rugose, serrate, and denticulate, slightly emarginate. Cerci lanceolate, much shorter than lamina, apex very acute.

	Female.
Length of body	25 mm.
Length of pronotum	7 "
Width of pronotum	13 "
Width of abdomen	14 "

Habitat.—Avoca, Riverina District of New South Wales.

A female, bearing the egg-capsule, was presented to the S.A. Museum by Miss Cudmore, of the above locality, in May, 1888. The capsule is reddish-brown, 10 mm. long, and 4 mm. in vertical diameter; the ridge has 23 very small teeth, and laterally 10 semi-cylindrical short keels adjacent to the suture, but separate from it, longest in the middle, and only indicated at the ends. The mesonotum exhibits a curious abnormity, viz., a considerable abbreviation of the left margin for the whole width of the segment, showing several rugosities, and at the anterior angle a short free lobe projecting from the underside of the pronotum. The opposite side is quite normal.

PLATYZOSTERIA SCABRA, *Brunner* (Syst., 213).

"Deep black, rather broad and convex. Abdomen dorsally with elevated dots and streaks, the last segments laterally serrate.

	Male.	Female.
Length of body	27 mm.	31 mm.
Length of pronotum ...	8 "	8 "
Width of pronotum ...	13 "	14 "

Habitat.—Sydney, New South Wales."

PLATYZOSTERIA SCABRELLA, *spec. nov.*

Dull deep-black, lateral margins narrow deep-red, rarely wholly black. Antennæ with the long basal joints black, remainder yellow. Pronotum with more or less numerous, rather large, impressed dots. Meso- and meta-notum rugose with irregular raised asperities. Abdomen asperous with small tubercles along the hind-

margins of segments, and one or more irregular intermediate rows, hindangles produced as acute flat spines, the last segment laterally dentate, and with very large spines. Underside of body and legs wholly black, rarely slightly lurid. Coxæ narrowly bordered with yellow. Ventral segments of abdomen from nearly smooth to scabrous. Supra-anal lamina of male rugose, hindmargin entirely ciliate ; of female rounded, dentate, emarginate. Cerci lanceolate, flat, black, apex pale. Subgenital lamina of male pale reddish or brown, hindmargin concave, lateral angles much and acutely produced. Styles inserted laterally near the base.

	Male.	Female.	Larvæ.
Length of body ...	19–23 mm.	19–22 mm.	14–18 mm.
Length of pronotum...	5– 6 "	5– 6·5 "	3–4·5 "
Width of pronotum ...	8–10 "	9–10 "	6–8 "
Width of abdomen ...	10–12 "	12–14 "	8–9 "

Habitat.—Adelaide, Belair, Largs Bay, and Ravine des Casoars, Kangaroo Island ; South Australia. S.A. Museum.

This species resembles the preceding species, but is much smaller, and the margin is distinctly paler. It is one of the commoner kinds, there being 20 specimens in the collection (eight males, nine females, and three larvæ), most of which were captured by myself from March to June inclusively. At this time they are rather numerous, living concealed by day in cool places, such as dead wood and other vegetable debris, with which they are occasionally brought into towns, but avoid houses, and soon disappear. Their odour on handling is strong, and very disagreeable. In some specimens the texture is much smoother than in others, while in rare cases, the paler markings are almost entirely absent, excepting the antennæ and the tips of the cerci.

Platyzosteria castanea, *Brunner* (System, 214).

" Brownish-chestnut. Body convex in the middle. Elytra lobiform. Supra-anal lamina of male slightly *impressed* in the middle, *angles acute ;* of the female serrulate, sub-emarginate.

	Male and Female.
Length of body	21 mm.
Length of pronotum	6 "
Width of pronotum	9 "

Habitat.—New South Wales."

Platyzosteria pseudocastanea, *spec. nov.*

Resembling the preceding. Legs uniformly reddish-brown, tarsi paler. Supra-anal lamina of male very scabrous, middle arched, margin subrotundate, dentate, emarginate, reddish, the

teeth red; of the female flat, nearly entire. Cerci shorter than the lamina, apex red. Styles minute.

	Male.	Female.	Larvæ.
Length of body ...	17 mm.	17 mm.	14 –15 mm.
Length of pronotum	4 "	5 "	3 – 3·3 "
Width of pronotum	7·5 "	8 "	6·5– 7 "
Width of abdomen	9 "	11 "	8 - 8·5 "

Habitat.—Tanunda and Ardrossan, South Australia. S. A. Museum.

A pair of adults and of larvæ were collected by me in October and November at the above localities. The differences indicated seem to preclude the inclusion of this in the preceding species.

Platyzosteria truncata, *Brunner* (System, 217).

"Testaceous-chestnut. Pronotum oblong, reddish-chestnut, lateral margin broadly testaceous. Elytra corneous, subquadrate, sutural margins touching, anal vein impressed. Wings none. Legs testaceous. Abdomen bordered testaceous.

	Female.
Length of body	17 mm.
Length of elytra	4·5 "
Length of pronotum	5 "
Width of pronotum	6 "

Habitat.—New South Wales; New Zealand."

Platyzosteria Nova-Zealandiæ, *Brunner* (Syst., 218).

"Reddish-black. Body depressed, oblong, with very fine impressed dots, scabrous. Antennæ as long as body, base black, reddish towards apex. Elytra of both sexes rudimentary, lanceolate, obliquely truncate behind. Supra-anal lamina of the male impressed in the middle, reddish ciliate; of female emarginate. Cerci shorter.

	Male and Female.
Length of body	19 mm.
Length of pronotum	6 "
Width of pronotum	8 "

Habitat. — Williamstown and Tanunda, South Australia *(Tepper).* S.A. Museum. Auckland, New Zealand *(Brunner).*

The specimens before me, which I have referred to this species for the present, exhibit the following variations of details :—The thoracic segments bordered reddish-brown, disk much darker, abdomen black, scabrous. Legs bright-brownish-red, tarsi paler. Supra-anal lamina of male finely dentate, emarginate; of the female more distinctly dentate, slightly emarginate. Cerci red at the apex. Styles of male rather long, red. Somewhat smaller in size.

PLATYZOSTERIA TRIFASCIATA, *spec. nov.*

Deep-brown or black, margin mostly paler, minutely scabrous with rather large depressed dots over thoracic segments Pronotum semicircular, hindmargins of all thoracic segments broadly pale straw-coloured or yellow. Elytra none. Legs and underside black, coxæ bordered yellow. Abdomen concolorous, posterior angles more or less acutely produced, hindangles of segment eight, and the cerci red. Supra-anal lamina of male truncate, black, hindmargin densely ciliate, with tan-coloured hairs, angles with a slender spine; of female sub-semicircular, margins dentate. Subgenital lamina of male subquadrate, slightly exceeding the supra-anal, hindmargin concave, serrate, angles spinose, styles slender, acute, as long as lamina, black; subgenital plate of female short, subtriangular margin entire.

	Male.	Female.
Length of body ...	20–22 mm.	21 –23 mm.
Length of pronotum	5– 6 "	5·5– 6·5 "
Width of pronotum	9–11 "	10 –12 "

Habitat.—Northern Territory of South Australia.

The examples of this species were presented to the S.A. Museum by Hon. Dr. S. J. Magarey, 1886, and consist of eight males and seven females. All are remarkable for the uniformity of their character. The three pale bands render the species easy of recognition.

PLATYZOSTERIA BALTEATA, *spec. nov.*

Small. Shiningly black. Face with minute yellow, ocelliform spots. Antennæ and palpi reddish-brown. Pronotum with small, distant, impressed spots, margins pale yellow. Meso- and meta-notum similar, pale border of hindmargin abruptly terminated by lobes of elytra, wider laterally, narrower in the middle. Elytra lobiform, apex rounded, exterior margin pale. Abdomen with hindangles of segments more or less acutely produced, lateral margins very narrowly brown, hindmargin pale yellow, bordered with brown anteriorly; ventral segments and coxæ bordered white. Legs reddish-brown, tarsi whitish beneath. Supra-anal lamina subconical, finely serrate and slightly emarginate. Cerci black, apex red.

	Female.
Length of body	12 –15 mm.
Length of pronotum	3·5 "
Width of pronotum	6 "

Habitat.—Callington, South Australia. S.A. Museum.

Three females were captured by me in January under decaying vegetable debris. The species appears to resemble Walker's *P. polyzona*, but differs in being much smaller and having lobiform

elytra. It also resembles certain larval stages of *Apolyta* spp. in the type of markings, but otherwise widely removed, and is the smallest probably of the family.

PLATYZOSTERIA LATIZONA, *spec. nov.*

Reddish-brown above and beneath, lateral and hindmargins of all segments broadly ochreous-yellow. Head reddish; ocelliform spots minute; lower margin of clypeus, palpi, and antennæ yellowish. Thoracic segments rugose, with coarse impressed dots. Legs pale yellowish, middle and hind coxæ with a black patch at the base; tibiæ from brownish to blackish-brown, Abdomen scabrous, with numerous small tubercles, hindangles acute, those of the last segments produced as acute trigonal spines. Supra-anal lamina of male broad, quadrate, angular, hindmargin concave; of female tapering, hindmargin truncate, angles rounded, slightly emarginate, and with three minute teeth on each side of the notch, in both sexes yellowish, base black. Cerci lanceolate, blackish, apex pale. Subgenital lamina of male blackish, with paler median line and hindmargin, subquadrate, lateral and hindmargins concave, angles produced as acute spines; styles slender, black. Subgenital plate of female brown, apex black, acute.

	Male.	Female.
Length of body ...	17–21 mm.	22 mm.
Length of pronotum ...	5 "	6 "
Width of pronotum ...	9 "	11 "

Habitat.—Mount Bryan East, South Australia (*Thos. Best*). S.A. Museum.

This is a very handsome species and differs from the following not only in colour, but also in the rugosity of the thoracic segments, &c. It may come near to *P. zonata*, Walker, at least in colour.

PLATYZOSTERIA ARDROSSANENSIS, *spec. nov.*

Dull ferruginous. Head and the underside of the body wholly pale straw-coloured; antennæ dark-brownish, basal joints pale, ciliate. Pronotum thickly studded in the disk with minute reddish tubercles in a pale ground, all margins pale straw-coloured, lateral margins incrassated, a black streak between it and the disk. Meso- and meta-notum similar, base of former mostly narrowly black. Legs pale; tibiæ reddish, with red spines; tarsi more or less black above. Abdominal segments banded, base blackish, middle pale, with red dots, hindmargin dull greyish-olive, shading into a narrow whitish border-line in segments one and five; hindmargin of six and seven broadly yellow, base more on less broadly black, middle band nearly obsolete; hindangles acutely produced posteriorly. Supra-anal lamina quadrate, angles, rounded, base black, hindmargin nearly straight,

finely ciliate; of female conical, rounded, slightly emarginate, varied with black. Cerci of both sexes linear, apex shortly acuminate, bristly. Subgenital lamina of male subquadrate, angular, broadly emarginate, angles blunt; styles slender, with black tips. Subgenital plate of female triangular, concolorous.

	Male.	Female.	Larvæ.
Length of body	15 mm.	18 mm.	14 mm.
Length of pronotum ...	4 "	6 "	4–5 "
Width of pronotum ...	7 "	9 "	7–8 "

Habitat.—Ardrossan (Yorke's Peninsula), South Australia. S.A. Museum.

A pair of adults and two female larvæ were captured by me towards the end of November under stones; a young, very pale male larvæ from Nalpa, Lower River Murray (presented by Dr. J. E. Stirling), appears to belong also to this species, although somewhat different.

PLATYZOSTERIA LIGATA, *Brunner* (Syst., 220).

Cosmozosteria ligata, Stăl, Rech. Blatt., 1877.

Reddish-chestnut, wholly bordered with pale-yellow. Wingless. Abdomen of male dilated, depressed, hindangles obtuse. Supra-anal lamina of male transverse, hindmargin straight, entire. Subgenital lamina produced, in the middle triangularly emarginate, lobes acute angular, lateral margins sinuate; styles very long, inserted at base.

	Male.
Length of body	18 mm.
Length of pronotum	6 "
Width of pronotum	9·5 "

Habitat.—Port Curtis, Queensland."

Not having seen Stăl's definition of the genus, I prefer recording the species under Brunner's name. It may perhaps become advisable to unite all the conspicuously-banded species in a separate genus.

PLATYZOSTERIA *(Polyzosteria)* BIFIDA, *Saussure.*

Mel. Orth., in Memoires Soc. Phys. de Genéve, 1873.

Habitat.—Queensland

Description not seen.

PLATYZOSTERIA LATERALIS, *Walker* (Brit. Mus. Cat., 154).

"Black, convex, elliptical, very thinly punctured, lateral margins dark-red; beneath piceous, shining, and thinly punctured. Head piceous; antennæ black, stout. Pronotum with an ochraceous point in front, and a broad, oblique streak laterally and anteriorly. Meso- and meta-notum with an ochraceous spot

on each side near foremargin, hindangles hardly elongated. Legs red, rather stout, coxæ bordered with yellow. Abdomen tuberculate above, laterally with ochraceous spots. Supra-anal lamina slightly emarginate. Cerci lanceolate, slender, apex red. Styles distinct. Female larger than male.

Length of body (male and female) 15–23 mm.

Habitat.—Australia."

Probably belonging to *Periplaneta.*

The descriptions of this and following species of Walker are abbreviated, and the details re-arranged.

Platyzosteria ferruginea, *Walker* (ibid, 158).

" Ferruginous, convex, elliptical, extremely minutely punctured, red beneath. Pronotum nearly semicircular, with some large marginal punctures, and an oblique yellow streak on each side anteriorly. Meso- and meta-notum thinly and largely punctured, the former with a testaceous dot on each side near foreborder; latter testaceous laterally, hindangles slightly produced. Legs red, posterior coxæ bordered black and pale yellow. Abdomen slightly tuberculate, lateral margins dark-reddish. Supra-anal lamina emarginate. Cerci lanceolate, moderately long. Styles distinct.

Length of body (male) ... ... 20 mm.

Habitat.—Australia.

Platyzosteria zonata, *Walker* (ibid, 159).

" Piceous, elongate-oval, convex, very thickly and finely punctured. Pronotum with a luteous border, widest opposite the hindangles. Meso- and meta-notum with hindmargin luteous, widest laterally, hindangles not produced. Legs stout, coxæ bordered yellow. Abdomen wider than thorax, roughly punctured, Supra-anal lamina truncate, angles acute. Cerci stout, wholly red, or only at the apex. Styles rather long.

Length of body (female) ... ... 18–23 mm.

Habitat.—Port Essington, North Australia.

Platyzosteria polyzona, *Walker* (ibid, 159).

Piceous, broad-oval, convex, smooth, shining. Head tawny, with a piceous spot on the face; antennæ tawny at the base. Pronotum with a narrow ochraceous border, and a few punctures. Meso- and meta-notum, also abdominal segments, ochraceous bordered laterally and behind. Abdomen piceous beneath at the apex. Supra-anal lamina of female entire (?). Cerci, short, broad, lanceolate.

Length of body (female) ... ... 27–29 mm.

Habitat.—Western Australia.

Platyzosteria quadrifascia, *Walker* (ibid, 160).

Deep black, oval or fusiform, very convex, very thickly and minutely punctured, smooth, shining. Head thinly punctured. Pronotum with fore and hindmargins ochraceous. Meso- and meta-notum with hindmargins ochraceous, angles scarcely produced. Coxæ bordered with yellow. Abdomen roughly punctured, hindmargins of segments six and seven slightly and acutely produced. Supra-anal lamina serrate. Cerci lanceolate

Length of body (male and female) ... 19–23 mm.

Habitat.—Australia.

Platyzosteria pectoralis, *Walker* (ibid, 160).

"Black, elongate oval, convex, shining, very thinly punctured. Head with a luteous dot adjoining the sockets of the antennæ. Pronotum irregularly bordered luteous in front and behind. Meso- and meta-notum with luteous hindmargins widest laterally, angles hardly elongate. Pectoral segments bordered pale yellow. Abdomen piceous, thickly punctured. Supra-anal lamina truncate, with a subapical spot on each side. Cerci tawny, moderately long. Styles well developed.

Length of body (male) ... ... 20 mm.

Habitat.—Victoria River, North Australia.

Platyzosteria tarsalis, *Walker* (ibid, 162).

"Black, elongate oval, convex, smooth, shining. Head with ocelliform spots, sockets of antennæ and frontal margin tawny; antennæ dark red, basal part black. Pronotum very thinly punctured in the disk, also with an indistinct, scutcheon-shaped figure, sides minutely tuberculate. Meso- and meta-notum similar, angles not produced. Elytra slightly indicated. Coxæ and femora mostly dark red, the former bordered with yellow, tarsi tawny towards the tips. Abdominal segments laterally tuberculate, smooth in the disk, segments six and seven wholly tuberculate. Supra-anal lamina tuberculate, hindmargin emarginate, serrate, beneath dark red in the disk. Cerci nearly linear, rather slender. Subgenital lamina tawny.

Length of body (female) ... ... 26–29 mm.

Habitat.—New South Wales.

Platyzosteria *(Chalcolampra)* cuprea, *Sauss.*

Mel. Orth. V., fig. 3; Brit. Mus. Cat., 143.

Habitat.—King George's Sound and Swan River, West Australia.

Description not seen

Leptozosteria, *gen. nov.*

Etymology :—*Leptos*=thin ; *zostron*, a girdle.

Body very flat and thin, elongate. Integument soft. Supra-anal lamina of male triangular, terminating in an acute apical spine. Colour pale, with dark bands.

The form and termination of the supra-anal lamina appear to be quite exceptional among the Blattariæ. Similarly unusual in the related genera is the pale ground-colour with the bands dark, instead of the reverse, which is the usual coloration. I have therefore considered it advisable to establish the genus provisionally for the reception of the single species until further material offers a better base for its final disposition.

Leptozosteria prima, *spec. nov.*

Elongate oval, yellowish. Head dark dusk-brown, ocelliform spots yellowish, very small. Pronotum elliptical in front, disk with a black quadrilateral figure, widest anteriorly, extending along the hindmargin, and including a yellowish four-sided space. Meso- and meta-notum similar, with a very narrow brown marginal line, hindangles rounded, scarcely produced. Elytra none. Legs brown, very flat, coxæ bordered pale. Abdomen above with the hindmargins of segments one to six black or dark-brown, segment seven paler, angles produced, acute, lateral margin of the last two segments finely serrate ; ventral segments piceous, laterally dark, disk paler. Supra-anal lamina dark-brown. Cerci slightly longer than lamina, gradually acuminate. Subgenital lamina of male with the styles stout at the base, remainder slender, acute.

	Male.
Length of body	29 mm.
Length of thorax	15 "
Length of abdomen	14 "
Length of pronotum	8 "
Width of pronotum	12 "
Width of abdomen	15 "

Habitat.—Cordilho Downs, Central Australia. S.A. Museum. This fine specimen was captured and presented by Mr. F. Archer in August, 1889.

Pseudolampra, *gen. nov.*

Body fusiform (narrow in front, broad behind), very convex above, more or less rugose, with impressed dots. Pronotum elliptical, hindmargin concavo-convex or nearly straight. Elytra and wings none. Legs long, slender ; tarsi elongated as in *Polyzosteria*. Supra-anal lamina of male transverse, almost

straight, densely ciliate. Cerci ciliate, more or less depressed, sublanceolate, distinctly longer than the lamina.

The species comprised in this genus resemble the females of *Epilampra* very much in shape and colour, and also in the more or less united valvules of the females, but differ very much in the two sexes being without a trace of elytra or wings. Nearest to them in general resemblance come some of the conspicuously-banded species of *Platyzosteria*, like *P. balteata*, *Ardrossanensis*, &c. I have therefore placed them here provisionally, though perhaps a better position could be found. The systematic position of this new genus is indicated in the synopsis, post p.

The generic name is an allusion to the resemblance mentioned above. The three species possess a type of colouring peculiar to them, and characterised by the double pair of light and dark bands of the abdominal segments.

PSEUDOLAMPRA PUNCTATA, *spec. nov.*

Yellow to ochraceous. Head brown; ocelliform spots, base of clypeus, basal joints of antennæ and the palpi reddish-yellow; antennæ slender, ciliate, blackish, much longer than half the body. Pronotum slightly truncate in front, laterally with numerous small, deeply-impressed dark dots; disk with numerous brownish-red, irregular spots and streaks arranged in a circular area, and disposed radially; hindmargin broadly dark-olive, much wider laterally and extending to the sides, or more or less displaced by the yellow ground-colour. Meso- and meta-notum similar, hindangles moderately produced, obtuse. Legs and underside reddish-brown, coxæ bordered pale-yellow, tibæ and tarsi mostly dark-brown. Abdomen yellowish above, with numerous red impressed dots, angles obtuse, not produced; hindmargin very broadly dusky olive, sometimes absent in segments six and seven; ventral segments two to five with a broad greenish-olive band bordered very narrowly with yellow anteriorly, segment seven concolorous, segments seven to eight with the hindmargin broadly blackish. Supra-anal lamina and cerci of both sexes ochre-yellow. Subgenital lamina of male subrotundate, broad, hindmargin broadly yellow, entire; styles ochre-yellow; valvules deep reddish-brown.

	Male.	Female.	Larvæ.
Length of body ...	27 mm.	30 mm.	23 mm.
Length of pronotum	7 "	8 "	6 "
Width of pronotum...	12 "	12 "	10–11"
Width of abdomen ...	14 "	15 "	13 "

Habitat.—Between Victoria Spring and the Fraser Range (*R. Helms*, Elder Exploring Expedition), West Australia. S. A. Museum; an adult and a larval pair were obtained in October, 1891.

The larvæ are much paler than the adults, and the markings less defined, excepting the minute dark dots.

Pseudolampra Rothei, *spec. nov.*

Ochreous-yellow. Head pale, with a dark dot between the antennæ and another on the clypeus; antennæ blackish, basal joints pale. Pronotum nearly smooth, fore and lateral margins broad, not dotted, disk circular, with a small, undotted, almost central patch from which radiate black, variously shaped and curved streaks and spots, which are unsymmetrically arranged; hindmargin dusky olive-green, very broad laterally, often replaced partially by the yellow body colour. Meso- and meta-notum similar, the black spots of the disk either separated in two curves, or more or less irregularly confluent, sometimes greatly preponderating over the ground-colour; hindmargin greenish-olive, very broad laterally, sometimes occupying the whole side. Underside black. Coxæ black in the young, partly brown in the adult form, all bordered with white; femora and tibiæ yellowish-brown, tarsi darker. Abdominal segments all banded, base narrowly black, hindmargin greenish-olive to pale-yellow, between them a narrow ochreous band near the base with a row of small black dots and a broader dark band; ventral segments, except the last two, wholly black, base of penultimate black, remainder ochreous yellow, unmarked, all bordered pale. Supra-anal lamina of male quadrilateral, narrower behind, ochreous-yellow. Cerci deficient in all specimens seen. Subgenital lamina of male ochreous, concolorous (plates of female black at the base); styles stout, short, acute.

	Male.	Female.	Larvæ.
Length of body ...	23 mm.	23 mm.	15–17 mm.
Length of pronotum...	5 "	6·3 "	3– 5 "
Width of pronotum ...	8·5 "	10 "	6– 8 "
Width of abdomen ...	12 "	13·5 "	8–11·5 "

Habitat.—Sedan (Murray Scrub), South Australia.

The species has been named after Mr. F. Rothe, who collected and presented the samples to the S.A. Museum, besides many other interesting specimens. One pair of adults, and two pairs of larvæ were examined.

Pseudolampra ornata, *spec. nov.*

Shiningly deep-black above and beneath. Head black; labrum, palpi and a triangular mark below each eye pale brownish-yellow; antennæ dull blackish, basal joints pale brownish-yellow. Pronotum finely wrinkled with a few small, distinct, impressed dots laterally; all margins narrowly yellow. Meso- and meta-notum similar, hindangles scarcely produced. Legs pale reddish

coxæ bordered white. Abdomen with lateral and hindmargins of all segments narrowly yellow, segments two to six with a narrow anterior band dotted black, and irregular borders yellow, interrupted (at least in the middle); ventral segments bordered narrowly white, last one concavely brownish-yellow behind; valvules of female black. Supra-anal lamina narrower behind, angles rounded, emarginate, base narrowly black, remainder yellow. Cerci slender, subconical, much shorter than the lamina.

	Female.
Length of body	23 mm.
Length of pronotum	7 "
Width of pronotum	10 "
Width of abdomen	13 "

Habitat.—South Australia (precise locality not recorded). S.A. Museum.

KNEPHASIA, *gen. nov.*

Etymology:—*Knephas*=dusky, referring to colour.

Elongate-oval to subfusiform, very convex, very *rugose*, with minute *raised tubercles*. Pronotum subsemicircular, lateral margins *incrassated*, angles *acute*, hindmargin quite straight. Elytra or wings none. Legs short, rather stout, femora thickly spined, tarsi very slender. Supra-anal lamina of male rounded, very slightly emarginate, glabrous. Cerci lanceolate, ciliate, slightly exceeding the lamina. Subgenital lamina of male broad, transverse, slightly emarginate, ciliate; of the female valvate. Monotypic.

In outline the genus resembles Brunner's figure of *Derocalymma dispar*, but is even removed from the division to which this belongs on account of its spinose femora. It is easily distinguished from all others by its peculiar dorsal texture, narrow, elongate form, short abdomen, and the form of the supra-anal lamina of the male. Both sexes being wingless, and the female possessing valvules, removes the genus from the *Epilampridæ*.

The following synopsis represents roughly the relationships of this and some other new genera to certain others of prior date: –

1. Femora spined.

2. Abdomen of female with last ventral segment valve-like. Wingless or elytra perfect, lobiform or absent.

PERIPLANETIDÆ.

3. Body very convex, elongate or fusiform. Wingless (resembling *Epilampra*).

4. Body with impressed dots. PSEUDOLAMPRA, *gen. nov.*

4.4. Body with raised tubercles. KNEPHASIA, *gen. nov.*

3.3. Body more or less flat, broadly or elongate oval.

4. Cerci as long, slightly longer or shorter than the lamina.

a. Elytra none. Integument rigid.

b. Legs short, stout. *Polyzosteria*, Burm.

bb. Legs long, slender. *Anamesia*, gen. nov.

aa. Elytra lobiform or more rarely absent. Integument softer.

c. Black or brown, bordered or banded pale, convex. *Platyzosteria*, Brunner.

cc. Pale, bordered or banded dark, flat. *Leptozosteria*, gen. nov.

4.4. Cerci much longer than lamina. Elytra and wings present, rarely absent. PERIPLANATA, *Burm.*

KNEPHASIA MEDILINEA, *spec. nov.*

Dusky-ochreous to pale-yellowish, with very numerous, minute, dark tubercles obscuring the ground colour. Head pale yellowish or tawny, with numerous black dots; antennæ and palpi very slender, long, pale yellowish, the former finely ciliate. Pronotum reddish tawny, lateral margins narrowly yellow, interiorly bordered by an ill-defined dusky stripe, a black median line from near the hindmargin extending to segment seven, gradually widening hindward. Meso- and meta-notum with hindangles slightly produced. Legs and underside pale-yellowish, with numerous black dots, margins of pectus broadly black. Abdomen short, broad in the female, pale at the base, hindmargins dusky, on each side of the dark median line an ill-defined, interrupted, paler stripe; angles increasingly produced to seventh segment, acute, a black, triangular spot on both penultimate ventral segments. Supra-anal lamina of both sexes concolorous (except the dark tubercles). Cerci of male longer than the lamina; of female shorter, black, apex yellow. Styles of male slender, much longer than the lamina.

	Male.	Female.
Length of body... ...	15 mm.	15–18 mm.
Length of pronotum ...	4 "	5 "
Length of abdomen ...	7 "	7– 9 "
With of pronotum ...	7 "	7– 8 "
Width of abdomen ...	8 "	9 "

Habitat—Sedan, South Australia (*F. Rothe*, three females); Lillimur, N.-W. Victoria (*A. Molineux*, one male); Northern Territory of S.A. (*Hon. Dr. S. J. Magarey*). S.A. Museum.

All the specimens are remarkably uniform, except that the male is much paler and brighter in colour, notwithstanding the wide distribution of the species.

PERIPLANETA, *Burmeister.*

Handb. II., 502; *Br.*, Syst., 221.

" Body oblong, flat above. Pronotum semiorbicular, anteriorly,

rotundate behind. Elytra and wings perfect, rarely abbreviate. Legs long, slender, very spinose. Tarsi compressed laterally, first joint longer than all the following ones together. Supra-anal lamina of male *emarginate* or *lobate*. Cerci pilose, distinctly acuminate, twice as long as the lamina."

Although adopting for the present the genus as defined above, it seems to me that its limits are drawn too far, and that the species possessing only lobiform elytra, that is, such not much exceeding the mesonotum and comparatively short cerci, might advantageously be united under another generic or subgeneric designation.

A. *Elytra abbreviated, wings rudimentary.*

PERIPLANETA ORIENTALIS, *Linné.*

Fauna Suec. n., 862 ; *Br.*, Syst., 226.

Blatta, L., 1745, &c. ; *Kakerlac*, Serv., Hist. Nat. Orth. ; *Stylopuyga*, Scdd.

" Brownish-ferruginous to chestnut Elytra of male not attaining the apex of abdomen, truncate ; of female slightly exceeding the mesonotum, lateral. Wings shorter than elytra in both sexes. Supra-anal lamina of male transverse, hindmargin membranous ; of female compressed, triangularly excised.

	Male.	Female.
Length of body ...	20--23 mm.	19 --23 mm.
Length of elytra ...	12--13·5 "	4·5-- 5 "
Length of pronotum	5-- 6·5 "	6 -- 6·5 "
Width of pronotum	7-- 7·5 "	8·5-- 9·5 "

Habitat.—All parts of the inhabited surface of the earth. In the collection of the S.A. Museum are specimens from Adelaide, Jamestown, Northern Territory, and Japan. The young larvæ are brownish-red, the older almost black ; hence the name of "Black Beetles."

PERIPLANATA RUFA, *spec. nov.*

Red, smooth, shining. Head pale-reddish, ocelliform spots yellow ; base of antennæ and sides of face pale reddish-yellow ; mandibles and palpi partly blackish. Antennæ as long as the body, dull ferruginous. Pronotum smooth, very shining, semicircular, convex. Elytra abbreviated, attaining to the hindmargin of second abdominal segment, very broad, apex rounded, remainder oblique, concave ; veins distinct. Coxæ pale ; tarsi dilated beneath, forming very thin lamina. Abdomen with the segments angular, six and seven dull dark-brownish, hindmargins of all narrowly rugose, with many minute sulci ; lobes of segment eight prominent, triangular. Supra-anal lamina of male entire, rounded. Cerci about three times longer than lamina, acute,

beneath hirsute, Subgenital lamina of male entire, rounded, laterally fringed with fine hairs; styles very short, thick, black, inner side fringed, almost apical.

	Male.
Length of body	22 mm
Length of elytra	9 "
Length of pronotum	5 "
Width of pronotum	9 "

Habitat.—Oodnadatta, Central Australia. S.A. Museum.

An officer in the Government employ—Mr. F. Juncken, who has occasionally presented specimens—mentioned in one of his letters that cockroaches proved rather annoying. At my request for specimens, a single male was kindly and obligingly sent, which proved, as I had surmised, to be so different in details that I feel justified in assigning specific rank to it. The species is specially remarkable for the peculiar form of the genital parts, the shape of the elytra, and the lamina-like compressed tarsi, which are very long and closely pectinated beneath to the base of the claws.

Periplaneta concinna, *Hagenbach.*

Bijdrag, 1842; *Br.*, Syst., 228.

"Brownish-chestnut; shining. Elytra shorter than abdomen in both sexes, acuminate.

	Male.	Female.
Length of body	12·5 mm.	14 mm.
Length of elytra	9 "	9 "
Length of pronotum ...	4·5 "	—
Width of pronotum ...	5·2 "	—

Habitat.—Australia, Java."

Periplaneta rotundata, *Brunner* (Syst., 230).

"Brownish-black, shining. Face spotted with testaceous. Elytra of female corneous, as long as pronotum is wide, rounded.

	Female.
Length of body...	24 mm.
Length of elytra	10 "
Length of pronotum	8·5 "
Width of pronotum	10 "

Habitat.—Fiji Islands."

B. Wings perfect; as long as, or longer than, abdomen.

a. Pronotum of two colours.

Periplaneta Americana, *Linné.*

Syst. Nat., 687; *Br.*, Syst., fig. 24.

Ferruginous. Head black above—pale, with reddish blotches, below the antennæ; latter much longer than the body, pale

ferruginous. Pronotum subrotundate, yellowish testaceous, two large ferruginous spots in the disk with indistinct outline, hindmargin blackish-brown. Elytra of male much exceeding—of female as long as—abdomen. Legs and underside pale, also basal part of abdomen above. Supra-anal lamina of male broad, incised, lobes broad, rounded ; of female triangular, deeply and narrowly incised, lobes narrow, apex obtuse. Cerci more than twice as long as lamina, tapering from the base. Styles of male filiform, much exceeding the lamina.

	Male.	Female.
Length of body ...	28–32 mm.	28–31 mm.
Length of elytra ...	28–32 "	26–28 "
Length of pronotum	7·5–8 "	9–10 "
Width of pronotum...	9·5–11 "	11–12 "

Habitat.—Adelaide, South Australia (S. A. Museum), and all continents.

The above description has been drawn up from nine specimens belonging to both sexes, the measurements which are taken from Brunner's work, are considerably exceeded by some.

Periplaneta oculata, *Walker* (Brit. Mus. Cat. Suppl., 152).

" Piceous, fusiform, shining, whitish beneath. Head whitish, a black band between the eyes ; antennæ piceous, tawny towards the base. Pronotum whitish, long, laterally bordered with black very narrowly, a very large piceous patch extending to the straight hindmargin, near latter two round whitish spots. Legs pale yellow, thick, rather short. Wings blackish-brown, not longer than abdomen ; elytra coriaceous, corneous towards base, with a whitish costal stripe tapering from the base to three-fourths of the length. Abdomen beneath reddish, laterally whitish.

	Female.
Length of body	20 mm.
Length of elytra...	20 "

Habitat.—Australia."

Periplaneta Australasiæ, *Fabr.*

Syst. Ent., 271; *Br.*, Syst., 233.

" Brownish-ferruginous. Face brown, with a pale trigonal patch or small spot, Pronotum blackish, transversely elliptical, hindmargin nearly straight, intramarginal band sharply defined, humeral streak yellow. Elytra longer than the abdomen.

	Male.	Female.
Length of body	24 mm.	26 mm.
Length of elytra	27 "	24 "
Length of pronotum ...	7 "	8 "
With of pronotum... ...	9·5 "	11 "

Habitat.—Madeira, St. Thomas, Columbia *(Burm.);* Batavia *(Brunner);* Sumatra *(de Haan);* Cuba, Brazil, Mexico, Peru, Australia *(Walker*, Brit. Mus. Cat., 324)."

Periplaneta ligata, *Brunner* (Syst., 237).

"Brownish ferruginous, with the anterior and lateral margin bordered yellow. Legs testaceous, middle tibiæ bordered brownish, hind tibiæ wholly brown. Supra-anal lamina of male quadrate, triplicate; of female much produced, middle subcarinate, hindmargin deeply emarginate, angles acute. Subgenital lamina of male transverse, subemarginate; styles very long.

	Male and Female.
Length of body	25 mm.
Length of elytra...	22 "
Length of pronotum	7 "
Width of pronotum	10 "

Habitat.—Moreton Bay, Port Curtis, Queensland."

Periplaneta inclusa, *Walker* (Brit. Mus. Cat., 127).

"Blackish, fusiform, smooth, shining, yellow beneath. Head yellow, a piceous band across the face. Pronotum with two yellow bands connected on each side and forming an irregular fusiform ringlet, hinder band much broader and more irregular. Elytra and wings extending a little beyond the abdomen, former semicoriaceous, towards base corneous, blackish, with a yellow, subcostal, lanceolate streak from the base to one-third of length. Wings not paler.

	Male.	Female.
Length of body	22·5 mm.	24 mm.
Length of elytra	30 "	25 "

Habitat.—St. Domingo, West India; New Hebrides, Polynesia."

Periplaneta curvigera, *Walker* (ibid, 134).

"(Section 6. Sides of pronotum and costa of elytra dilated, hyaline; hindmargin straighter than in section 1. Costa of elytra rounded. Two species.)

Pale-yellow, fusiform, smooth, shining. Head with a black band on the vertex; antennæ piceous, base testaceous, slender. Pronotum much dilated behind, with two black stripes in the disk. Legs short, stout. Wings extending beyond the abdomen; elytra coriaceous, a broad black stripe along the hindmargin extending nearly to the apex; hindwings membranous, pellucid, veins pale.

	Female.
Length of body	16 mm.
Length of elytra	18 "

Habitat.—Moreton Bay, Queensland."

This species belongs most probably to some other group (*Ichnoptera ?*).

Periplaneta biquadrata, *Walker* (ibid).

"Pale testaceous, fusiform, flat, shining, nearly smooth. Head with an irregular black band between the eyes; antennæ piceous, base testaceous, as long as the body. Pronotum mostly covered by a large scutcheon-shaped piceous patch, extending to hindmargin, near it including on each side, a large, subquadrate, testaceous spot; hindmargin scarcely rounded. Elytra piceous, membranous, with a pale testaceous costal stripe decreasing in width to apex. Wings piceous, a little larger than elytra, not paler.

Length of body (?)	20 mm.
Length of elytra	24 "

Habitat.—Australia."

b. Pronotum of the same colour as the body, concolorous.

Periplaneta pallipalpis, *Serv.*

Hist. nat. 71, n. 7 (*Kakerlac*); *Br.*, Syst., 238.

"Chestnut-coloured, shining. Mouth and palpi pale. Pronotum semi-circular. Elytra exceeding the abdomen, anal area very smooth, all longitudinal veins perspicuous towards the apex.

	Both sexes.
Length of body	21 mm.
Length of pronotum	6·5 "
Width of pronotum	9·5 "

Habitat.—Java, Sumatra (*Serville, de Haan*); Australia (*Brunner*)."

Periplaneta apicalis, *Walker* (Brit. Mus. Cat., 129).

"Testaceous, fusiform, shining, paler beneath. Pronotum with the sides slightly reflexed, curved near hindmargin, which is slightly rounded. Elytra slightly exceeding the wings, both the abdomen; humeral veins forked, longitudinal veins simple, transverse veinlets numerous. Wings pale cinereous, costa, apex and veins testaceous; *triangular area rather large* (?). Abdomen pale-yellowish, apex testaceous (Walker's Sect., 1).

	Female.
Length of body	18 mm.
Length of elytra	22 "

Habitat.—Australia."

This species belongs probably to the *Chorisoneuridæ*.

Periplaneta convexa, *Walker* (ibid, Suppl., 152).

"Black, smooth, shining, convex, elliptical. Palpi piceous; antennæ setaceous, much longer than the body. Pronotum shortly conical. Elytra coriaceous, convex, extending a little beyond the body, costa and apex rounded; *covered portion of right one membranous, slightly paler.* Wings resembling membranous part of elytra, slightly longer. *Cerci broad, short.* Female (size not given).

Habitat.—Moreton Bay, Queensland."

The italicized parts of the description indicate that the species scarcely belongs to this genus.

Of the following species the descriptions have not been available. Walker places the first two with *P. Americana* in his Sect. 1; they will therefore be long-winged forms; the third is possibly synonymous with *Pseudophyllodromia Heydeniana*, Sauss., in fasc. 2 Mem. Soc. Phys. de Genéve, 1870.

Periplaneta marginalis, *Saussure.*

Rev. Zool., 1864, No. 30; Mel. Orth., 31.

Habitat.—Queensland, Western Australia (*Walker*).

Periplaneta sorar, *Saussure* (ibid, no. 35).

Habitat.—Australia.

Periplaneta Heydeniana, *Sauss.* (Rev. Zool., 1864, Nov. 29).

Habitat.—West Australia.

c. Elytra lobiform or absent. Body mostly black, concolorous. Cerci not twice as long as lamina. Valvules normal. Subgenus Syntomaptera, *mihi,*

Periplaneta fortipes, *Walker* (Brit. Mus. Cat., 137).

"Black, fusiform, shining, very thickly and minutely punctured. Head smooth, sockets of antennæ, labium and palpi piceous; antennæ dark-red, basal part black, as long as the body. Pronotum with a very shallow lateral furrow, hindmargin straight. Elytra absent. Legs stout, reddish-black, tarsi red towards the apex. Abdominal segments six and seven with angles produced, acute. Supra-anal lamina truncate. Cerci long, lanceolate.

Length of body (both sexes) ... 22–27 mm.

Habitat.—West Australia, Tasmania, New Zealand."

Periplaneta invisa, *Walker* (ibid, 137).

"Resembling *P. fortipes*. Head with reddish labrum. Supra-anal lamina emarginate. Coxæ bordered with yellow.

Length of body (both sexes)... ... 27–32 mm.

Habitat.—Australia (N.S.W. ?); West Australia."

Periplaneta glabra, *Walker* (ibid, 139).

"Deep black, oval, convex, smooth, shining. Antennæ black. Pronotum rounded laterally, hindmargin straight. Metanotum with angles slightly produced. Elytra triangular, corneous, rudimentary. Legs short. Abdominal segments with the angles successively more elongated, acute. Supra-anal lamina bilobed, lobes tetragonal. Cerci fusiform, flat Styles long, slender.

Length of body (male) ... ... 18 mm.

Habitat.—Australia."

There are three female specimens in the collection of the S.A. Museum, which I refer to this species, and from which the following description is drawn up :—

Deep black, narrowly fusiform, very convex and shining, hind-margins of segments narrowly lurid. Head and antennæ black; ocelliform spots, margins of clypeus and labrum, also palpi, very pale. Thoracic segments laterally narrowly reflexed; disk polished, with distant impressed dots, hindmargin of metanotum convex. Elytra absent. Underside and legs dark piceous, tarsi and spines brown; claws pale. Abdominal segments angular, posterior ones produced, acute, hindmargin scabrous, minutely dotted. Supra-anal lamina tapering, deeply emarginate, angles rounded. Cerci nearly twice as long as lamina, lanceolate, thick, acute, black.

	Female.
Length of body	15 mm.
Length of pronotum	4·5 "
Width of pronotum	6 "
Width of abdomen	8 "

Habitat.—Northern Territory of South Australia. S.A. Museum, presented by the Hon. Dr. S. J. Magarey.

Periplaneta obscura, *sp. nov.*

Resembling the preceding; dull black-brown to black. Head, antennæ, and mouth parts reddish. Pronotum smooth, with a few impressed dots. Meso- and meta-notum, also abdomen, thickly and minutely tuberculate. Elytra lobiform, not exceeding the mesonotum. Legs short, stout, hind tibiæ short, entirely deep reddish-brown. Supra-anal lamina compressed, emarginate. Cerci broad, lanceolate, acute.

	Female.
Length of body	14 –15 mm.
Length of pronotum	3·5–4 "
Width of pronotum	6 "

Habitat.—Northern Territory of South Australia. S.A. Museum, presented by the Hon. Dr. S. J. Magarey.

PERIPLANETA SCABRIUSCULA, *spec. nov.*

Resembling *P. glabra.* Deep piceous to black, shining. Head black; antennæ, labrum, and palpi reddish. Pronotum smooth. Meso- and meta-notum slightly scabrous, with minute acute tubercles. Elytra lobiform in both sexes. Legs red, concolorous; tibiæ long; tarsi pale beneath. Supra-anal lamina of male subangular, deeply grooved in the middle; hindmargin concave, of female much compressed, emarginate. Cerci rather long, deep black, acute, extreme tip red. Subgenital lamina of male quadrilateral, angular, hindmargin concave; styles long, slender, black, apex red.

	Male.	Female.
Length of body ...	12–14 mm.	16 –18 mm.
Length of pronotum...	4– 4·5 "	5 – 6 "
Width of prototum ...	7– 7·5 "	7·5– 8·5 "

Habitat.—Belair (Mount Lofty Range), Port Vincent (Y.P.), Kangaroo Island (larvæ only): South Australia. S.A. Museum.

Some thirteen specimens were compared from the above localities. They were taken in June, living by day under loose bark of Eucalyptus-trees near the ground.

PERIPLANETA PROVISIONALIS, *spec. nov.*

Resembling the last. Brownish-red, scabrous, shining. Lobes of elytra very narrow. Abdomen brown below. Supra-anal lamina short, deeply and roundly emarginate. Cerci rather short. Valvules black.

	Female.
Length of body	12 mm.
Length of pronotum	4 "
Width of pronotum	6 "

Habitat.—Mount Bryan East. S.A. Museum, presented by Mr. T. Best.

DEROPELTIS, *Burm.*

Handb. II., 486; *Br.*, System, 240; *Blatta*, Serv.

"Male winged, female wingless. Head partly free above; antennæ thick, longer than the body. Elytra and wings of male doubly exceeding the abdomen, narrowed in the middle, apex acuminate. Femora very slender, spines very short, first joint of tarsi exceeding the following joints. Abdomen of male oblong;

of female broad and round, dorsal segments truncate, scarcely exceeding the ventral, fifth incised in the middle. Supra-anal lamina of male transverse, with an impressed medial line, margin entire; of female triangular, laterally deflexed. Cerci of male longer than lamina, articulate; of female short, inarticulate. Subgenital lamina of male rounded, large, exceeding the supra-anal; styles long.

The genus, as defined by Brunner, is chiefly of South African habitat, one species only being recorded doubtfully from Java. In the British Museum Catalogue, Walker records, p. 231, "*Epilampra irrorata*, Thunb., nov. spec. I., 76; Fabricius, Ent. Syst. II., 8," from Australia in three instances. Referring to Brunner's record of the literature quoted. "*E. irrorata*" is not mentioned at all, but the pages cited quote *Blatta erythrocephala*, Fabr. (Ent. Syst., II., p. 7 and 8), while *B. capensis*, Thunb. (Dissert. Ent., 77) is mentioned as a synonym of the former. Whence Walker obtained the name "*irrorata*" is not apparent, but most likely another synonym for *B. erythrocephalus*, Fabr. As I am not in a position to prove his localities wrong, I insert the genus on his authority.

DEROPELTIS ERYTHROCEPHALUS, *Fabr.*

Blatta, Fabr.; *Br.*, Syst., 242, fig. 38.

"Brownish-black, dull. Head red; antennæ rather thick, black, apex reddish. Legs ferruginous. Pronotum of male transverse, oval, rounded. Disk triangularly impressed. Elytra longer than wings, brownish-chestnut. Femora with sharp scattered spines. Female black, dull. Abdomen with fifth segment sinuate laterally.

	Male.	Female.
Length of body... ...	27 mm.	28 mm.
Length of elytra ...	33 "	—
Length of pronotum ...	5·2 "	7 "
Width of pronotum ...	8 "	12·5 "

Habitat.—Cape of Good Hope (authors); Australia (*Walker*)."

d. Elytra lobiform or absent. Valvules of female not, or scarcely free.

DRYMAPLANETA, *gen. nov.*

Etymology:—*Dryma*, wood; *planeta*, runners.

Body like *Periplaneta*, smooth, shining, margins pale. Antennæ setaceous, as long or longer than the body, ciliate. Elytra *lobiform, short, or absent;* wings none. Legs rather short; femora and tibiæ more or less densely spinose; tarsi with *first joint shorter, or scarcely longer than the following two together.* Supra-anal lamina of male moderately broad, more or less con-

cave; angles rounded; of female conical or triangular, compressed or flat, more or less deeply incised, angles acute. Cerci lanceolate, flat, acute, from one-half to twice the length of the lamina. Subgenital lamina of male with slender, acute *styles, inserted at the apex of the keels*, mostly produced. *Valvules* of female *conjoined*, not or scarcely free, the suture indicated by a furrow or keel separated by furrows from the adjoining membrane.

The genus differs from *Platyzosteria* by the longer cerci of both sexes, and the styles of the males; from *Periplaneta* by the lobiform elytra, pale margins, &c., and from all by the conjoined valvules of the female. The species frequent woods, never human habitations, unless carried there by accident. Their habits appear to be more or less nocturnal, leaving their hiding-places soon after sunset, or on cloudy days in the late afternoon, when they run about actively on the surface or ascend shrubs and trees in quest of their prey, viz., living insects of all kinds; and have therefore a claim, so far as ascertained, to rank as highly beneficial generally. Most of them are readily distinguished by the pale margins of the thorax or all round the body.

Drymaplaneta communis, *spec. nov.*

Elongate oval, black (or lurid when young), smooth, shining. Head and antennæ reddish, space at base of latter and mouth-parts pale-yellowish. Pronotum mostly with a faint dark-red median line, and a pale-yellow, cuneiform lateral stripe on each side, narrow in front, broad behind, bordered outside narrowly with black, and continued along the meso- and meta-notum, occasionally extending to the basal part of the adjoining abdominal segment, and sometimes reappearing in the form of round dots on one or more of the following ones. Elytra rather broad, inner part and apex black, not much exceeding the mesonotum. Underside of body piceous, varied with red. Coxæ broadly white-bordered; femora and tibiæ paler or darker red; tarsi pale-reddish. Abdominal segments angular, angles much produced, acute. Supra-anal lamina of male subangular, narrowed behind, angularly and broadly emarginate, ciliate; of female narrow, triangular, deeply emarginate, apex of lobes rounded. Cerci long. Subgenital lamina of male, like supra-anal, transverse, emarginate, angles rounded; styles long. Subgenital plate of female subvalvular.

	Male.	Female.
Length of body ...	21--25 mm.	18--20 mm.
Length of elytra ...	4 "	3 "
Length of pronotum	6-- 7 "	5-- 6 "
Width of pronotum	9--10 "	7-- 8 "

Habitat.—Mount Lofty Range, Adelaide, Nairne, Nuriootpa, Ardrossan (Yorke's Peninsula): South Australia. S.A. Museum.

Some ten specimens were examined, varying very slightly, as indicated above. The species differs from *Platyzosteria albomarginata*, Br., only in the form of the supra-anal lamina, greater length of cerci, and brighter colour of the legs; and the latter might probably be included in this genus with advantage. *D. communis*, as implied by the name, is one of the commonest species in the southern part of the province, occurring in the adult stage from June till January, and perhaps more seldom all the year round, but is very shy and active. Its odour is very disagreeable.

Drymaplaneta submarginata, *spec. nov.*

Dark piceous to chestnut, with the pale-yellowish margin nearly all round. Head of male, with trilobed vertex, and a patch like an hourglass in front reddish-brown, remainder pale-yellowish or whitish; of female concolorous, reddish; palpi whitish, second and third joints equally long, very thick; fourth joint shorter, pale-yellowish; antennæ ferruginous. Pronotum shining, pale margin contiguous in front, or more or less interrupted, a narrow dark-red medial line or broader lurid stripe (sometimes obsolete). Elytra short. Metanotum with the hindangles considerably produced, rounded. Underside dark chestnut. Legs with the coxæ pale-yellowish, with a blackish stripe; femora and tarsi rather darker; tibiæ reddish to brownish. Abdomen slightly dilated, hindangles of segments much produced, acute, lateral pale stripe interrupted by narrow black and brown hind-margin, reduced to short narrow streaks in segments six and seven. Supra-anal lamina of male quadrilateral, black, hind-margin retuse, slightly ciliate, angles obtuse; of female the hind-margin of segment seven bordered yellowish, lamina narrow, subtriangular, slightly compressed, deeply and triangularly emarginate, sides narrowly yellowish, lobes subacute. Cerci of male nearly twice as long as lamina, brown, concolorous; of female piceous, apex yellowish. Subgenital lamina of male transverse, truncate; styles slender, acute, red, nearly as long as the cerci.

	Male (adults).	Female (larvæ).
Length of body ...	21–23·5 mm.	21 mm.
Length of pronotum	7 "	5 "
Width of pronotum	9–10 "	7 "

Habitat.—South-western part of Kangaroo Island, Blakiston, Mount Lofty Range: South Australia. S.A. Museum.

There is some doubt as to the correct mating of the sexes. A very young larva from the Northern Territory and two others

from the South-East of our province resemble the above females, but may belong to another species.

Drymaplaneta obscuripes, *spec. nov.*

Piceous to black; a broad deep-yellow margin all round, bordered exteriorly very narrowly with black or brown, inner border line jagged; smooth, shining. Head, palpi, and basal joints of antennæ black, a band between the eyes, and the mouth-parts reddish. Pronotum irregularly wrinkled; hindangles of thoracic segments slightly produced, broad, rounded. Elytra wholly obsolete. Underside dark. Coxæ and femora blackish, former bordered with white, tibiæ and tarsi dark reddish-brown. Abdomen more or less lurid to dark red in the disk, bordered with black; angles keeled, produced as distinct spinelets; hindmargin of seventh segment yellow; beneath dark reddish, with a broad black margin. Supra-anal lamina of both sexes subtrigonal, deeply and acutely emarginate, lobes of male acute, of female obtuse, black, with two yellow spots. Cerci not twice as long as lamina, apex (male obtuse, female acute) pale. Subgenital lamina of male transverse, truncate; styles short, acute. Valvular plate of female with a broad furrow.

	Male.	Female.	Larva.
Length of body ...	23 mm.	25 mm.	20 mm.
Length of pronotum ...	5 "	5 "	4·5 "
Width of pronotum ...	9 "	9·5 "	8 "

Habitat.—West Coast of South Australia; Fraser Range, West Australia. S. A. Museum.

Only a larva, differing in some details, was collected at the latter place by Mr. R. Helms (Elder Expl. Exped.) on October 12, 1891, the other specimens (one male, two females) were probably collected by Prof. R. Tate at about the head of Great Bight.

Drymaplaneta subbifasciata, *sp. nov.*

Piceous, sometimes clouded with deep red, lateral margins broad, yellow, bordered with black, produced transversely along the hindmargins of the pronotum and metanotum, forming bands interrupted in the middle. Body smooth, with very numerous, minute, impressed dots. Vertex and face black, a broad curved band between the antennæ, sides, &c., pale yellow; antennæ pale reddish, palpi very pale. Pronotum and mesonotum with a broad subconical impression, medially and various wrinkles behind. Elytra obsolete. Underside piceous. Coxæ pale-yellowish, a black stripe anteriorly; femora dark-red, with two blackish stripes; tibiæ brown; tarsi paler. Abdomen with hindangles more or less produced, acute; hindmargin of segment

seven narrowly ferruginous, disk pubescent. Supra-anal lamina of female slightly compressed, emarginate, ciliate, lobes rounded. Cerci very long. Subgenital plate with a deep, broad, medial furrow, not free.

	Adult.	Larvæ.
Length of body (female) ...	22 mm.	17–21 mm.
Length of pronotum ...	6 "	5– 5·5 "
Width of pronotum ...	11 "	9– 9·5 "

Habitat.—Northern Territory of South Australia. S.A. Museum.

Of this conspicuously-coloured species one adult and three larval females were presented by the Hon. Dr. S. J. Magarey in 1886.

Drymaplaneta semicincta, *Walker.*

Periplaneta, Brit. Mus. Cat., 140.

" Black, fusiform, smooth, shining, piceous beneath. Vertex, labrum and palpi yellow; antennæ dark-red. A lateral yellow stripe extending from the foremargin of pronotum to second or third abdominal segment. Pronotum elongate, widening behind, hindmargin straight. Elytra lobiform, luteous, hindmargin black. Legs short, tarsi red towards the tips, or wholly black. Abdomen with angles produced, acute. Supra-anal lamina truncate, angles acute. Cerci long, lanceolate.

Length of body (both sexes) ... 18–20 mm.

Habitat.—Navigator's Isle; Formosa.

Drymaplaneta sexguttata, *Walker.*

Peripl., ibid, 141.

" Black, elliptical, convex, smooth, shining. Sockets of antennæ and labrum piceous; antennæ with a tawny, antemedial, very broad band. Thoracic segments each with a white spot near each hindangle. Pronotum subsemicircular, laterally very minutely punctured. Meso- and meta-notum with the angles slightly elongated. Elytra none. Legs short, thick, coxæ bordered white. Abdominal segments tuberculate, successively more produced, acute; beneath a broad, indeterminate stripe. Supra-anal lamina entire. Styles long.

Length of body (male) ... ... 13 mm.

Habitat.—Australia (perhaps a young larva)."

Drymaplaneta semivitta, *Walker.*

Peripl., ibid, 143.

" Black, fusiform, smooth, shining. Head with a yellow ban in front; labrum yellow; palpi pale yellow. Thoracic segment laterally with a yellow stripe bordered black laterally, inner side

undulating; underside mostly pale-yellow, sides rounded, hind-margin straight. Elytra lobiform. Legs thick, pale yellowish piceous. Supra-anal lamina bidentate.

Length of body (female)... ... ... 23 mm.

Habitat.—West Australia."

"In vol. II. of Capt. Ph. P. King's Survey of the Coasts of Australia, 1818-1822, page 454, a species is described as *Blatta australis*, McLeay, which may belong to this genus, but the description is wholly inadequate to fix family or genus, and the species will have to remain undeterminate."

II. Femora spineless or rarely the fore femora with a few spines.

A. Claws with arolia (except females of Heterogamidæ).

CHORISONEURIDÆ (*Br.*, Syst., 251).

"Head large, free, convex; eyes remote. Pronotum rounded or quadrate. Elytra quite explicate, acuminate; veins distinct, radial vein branching pinnately. Wings either with their anterior part acuminate, or the apical area folding and reflexed; anal area with radiating veins, fanlike. Femora spined at apex only. Abdominal segment with the angles straight or rounded, never produced. Supra-anal lamina of male rounded; of female similar or emarginate. Subgenital lamina of male rounded; styles provided."

There are several genera, mostly extra-Australian, with only a few species in each. They are mostly of very moderate size, and distinguished by the pinnately-branched radial vein of the elytra, and the very large triangular area of the wings, or in one genus, by the wings foldings traversely in the middle. Only two genera appear to occur in Australia.

CHORISONEURA, *Brunner* (System, 255, fig. 26).

"Elytra with the radial and ulnar veins separated. Wings perfect, apical area membranous. Femora unarmed, pilose. Supra-anal area of male scarcely produced; of female much produced, emarginate. Last ventral segment of female much contracted in the middle. Cerci long, slender, filiform in both sexes.

The five species described by Brunner are from Brazil (4), and Mexico (1). The Australian species may possibly justify a new genus for their reception, but the material available is too scanty for a complete diagnosis.

CHORISONEURA HYGROPHOROIDES, *Walker*.

Blatta, Brit. Mus. Cat., 96.

"Black, fusiform, depressed, ferruginous beneath. Head tawny in front, labrum and vertex testaceous. Pronotum

minutely punctured, laterally and posteriorly testaceous, laterally much dilated, hindmargin rounded. Legs short, ferruginous. Elytra smooth, coriaceous, costa rounded, testaceous towards the base, costal area broad. Wings cinereous, hyaline.

	Male.
Length of body	5 mm.
Length of elytra	5 "

Habitat.—Australia.

The above abridged description of Walker fits very well (as far as it goes) for the insects I refer to this species, but another supplementary description drawn up from the specimens examined may serve to define it better. The meso- and meta-notum of the male nymph, and the elytra of the adult female are reddish-brown, antennæ ferruginous, hirsute, as long as the body. Abdomen dark-brown in the disk; last dorsal segment, supra-anal lamina and cerci of female brownish testaceous, last ventral segment very much produced, subtrigonal, apex obtuse.

	Male.	Female.	Larvæ.
Length of body	6 mm.	7 mm.	4·5 mm.
Length of elytra	—	5·5 "	—
Length of pronotum ...	1·7 "	1·3 "	1·2 "
Width of pronotum ...	3 "	2·5 "	2 "

Habitat.—Mount Pleasant, Kangaroo Island, a doubtful larva from Mount Bryan East; South Australia. S.A. Museum.

Chorisoneura Loftyensis, *spec. nov.*

Brownish-ferruginous. Head, antennæ, pectus and legs yellowish. Pronotum very broad, much rounded laterally, two blackish transverse bars in the disk before the middle. Elytra of male as long as abdomen, of female shorter; veins raised. Abdomen laterally and medially blackish, with two broad submarginal brownish ferruginous stripes; apex and cerci brownish-ferruginous.

	Male.	Female.	Larvæ.
Length of body	7 mm.	8 mm.	5–7 mm.
Length of elytra	5 "	5 "	—
Length of pronotum ...	1·6 "	1·7 "	1·3 "
Width of pronotum ...	3·3 "	3·6 "	2·7 "

Habitat.—Mount Lofty Ranges, South Australia. S.A. Museum.

The insects are very nimble, and inhabit the narrow spaces under bark and the cracks and fissures of dead timber during the early and hottest months of the year.

Chorisoneura pectinata, *Saussure.*

Mel. Orth., in Mem. Soc. Phys., Genéve.
Habitat.—Australia.

Eleutheroda, *Brunner* (Syst., 264, fig. 29).

"Silky pilose. Head large. Pronotum semiorbicular in front, truncate behind. Elytra flat, almost rectangular, scarcely slanting, not exceeding the abdomen. Wings twice as long as the elytra, wholly folded back in the middle. Legs slender. Abdomen oblong, convex beneath. Supra-anal lamina of male transverse; of female rounded. Cerci small, base very broad, four-jointed. Subgenital lamina of male small; styles short.

The insects resemble Coleoptera considerably in appearance, and much more so than any other of the Blattariæ, except *Cassidiodes*, from the Philippine Islands, but of different type; the former apparently mimicking certain Tenebrionidæ, the latter resembling our black Paropsinæ.

Eleutheroda galerucoides, *Walker.*

Diploptera, Brit. Mus. Cat., 57.

"Tawny, flat, elliptical, shining, very finely punctured, minutely setulose. Head largely but distantly punctured. Antennæ submoniliform, shorter than body, base black. Pronotum transversely subelliptical, sides much rounded, semihyaline, hindmargin straight, disk with two interrupted, much abbreviated, blackish bands. Elytra coriaceous. Wings cinereous, hyaline. Legs moderately long. Abdomen piceous, slightly longer than elytra. Supra-anal lamina deeply concave above, or margin much deflexed, tawny. Cerci long, tawny.

Length of body (female) ... ... 6 mm.

Habitat.—Tasmania."

Panchloridæ (*Br.*, Syst., 266).

Head rather thick, partly or wholly covered by pronotum. Pronotum mostly smooth, angular or truncate behind, flat or hooded. Elytra perfectly explicate (except *Oniscosoma*), rounded, without apical area, anal vein impressed, axillary veins very close. Wings rounded in front, apical area not distinct, fan-like explicate, anal area fan-like, ulnar vein pectinate. Femora unarmed; tarsi with arolia. Abdomen depressed, angles of dorsal segments acute. Supra-anal lamina of both sexes quadrate, incised, or entire. Both sexes winged, except in *Oniscosoma.*

Most species of the six small or moderately-sized genera of this family are extra-Australian, and widely distributed. The chief distinctions are the quadrate, incised or entire lamina of the

female, the produced angles of the hindmargins of segments, and the possession of wings by both sexes, excepting in one genus.

Whether Walker's species is rightly placed I cannot say, not having seen any specimens.

NAUPHOETA, *Burmeister.*

Handb. II., 508 ; *Br.*, Syst., 283, fig. 38.

"Antennæ setaceous, slightly shorter than the body. Pronotum truncate in front and behind, laterally much deflexed, hindangles obtuse. Abdomen scarcely dilated, nine dorsal segments. Supra-anal lamina of male quadrate, angles obtuse, middle impressed ; of female transverse, angles rounded, emarginate, and plicate in the middle. Cerci not exceeding the supra-anal lamina, smooth."

All the few other species, besides the following, occur in Africa and America.

NAUPHOETA DISCOIDALIS, *Walker* (Brit. Mus. Cat., 39).

"Black, elongate fusiform, flat, shining, thinly punctured. Head with pale-yellow ocelliform spots, a transverse impression near them, and a yellow band near the mouth. First joint of palpi testaceous. Antennæ very slightly setulose, sockets pale yellow. Pronotum yellow, sides rounded, margin and a discoidal spot black, latter slightly concave in front, with two notches behind approaching close to hindmargin. Meso- and meta-notum with hindmargins yellow. Elytra unsymmetrical in colour, left elytron piceous, with three unequal yellow spots, apex grey, hyaline, veins hyaline, costa and costal veins yellow, rounded towards the base ; right elytron pale-grey, hyaline, except the yellow marks and an intermediate piceous patch. Wings pale-grey, hyaline, costal streak and veins brownish. Legs tawny, stout. Abdomen piceous, with lateral triangular, testaceous spots, beneath tawny at the base. Supra-anal lamina testaceous, slightly notched.

	Both sexes.
Length of body	18 mm.
Length of elytra	12–18 "

Habitat.—New Guinea ; Waigou."

Stated to resemble *N. amoena*, Saussure, but to differ in the markings.

ZETOBORA, *Burmeister.*

Handb. II., 509 ; *Br.*, Syst., 288, fig. 39.

" Head depressed, covered by pronotum. Pronotum rhombic, rounded in front, subtruncate behind, lateral angles acute, foremargin reflexed, disk cucullate, impressed punctate or granulate. Scutellum free. Elytra with very broad base, attenuated towards

the apex. Wings with median vein undivided. Abdomen with hindangles of dorsal segments much produced. Supra-anal lamina of female quadrate."

The nine species recorded by Brunner are all South American, also all those under section 1, 7 and 8, by Saussure and Walker. It is therefore quite probable that all those from Asia, Africa, and Australia, cited by the two last authors, do not belong to this genus, especially as "*Z. granicollis*," Sauss. (Section 6), has been suggested as synonymous with *Oniscosoma castanea*, Brunner, but this can only be decided by studying the types.

ZETOBORA ANTICA, *Walker* (Brit. Mus. Cat., 47).

"Blackish, elongate fusiform; testaceous beneath. Head black, shining, transversely impressed between the antennæ testaceous towards the mouth, also the palpi. Antennæ half the length of body. Pronotum with reflexed margins, minutely and darkly tuberculate, testaceous, semihyaline, angular, space behind not excavated, hindmargin hardly rounded, outline of blackish part angular, laterally notched. Elytra ferruginous, concolorous. Wings grey, lurid towards the costa. Legs tawny. Sub-anal (?!) lamina entire. Cerci piceous or tawny.

Length of body (both sexes)	...	...	18–20 mm.
Length of elytra	...	...	24–26 "

Habitat.—Australia.

ONISCOSOMA, *Brunner* (Syst., 298).

Zetobora, Saussure; *Laxta*, Walker (young form).

Males winged, females wingless. Pronotum lenticular, exceeding the head very much, lateral angles of male rounded, of female acute, hindmargin of male rounded, of female subtruncate; in the middle (above the head) more or less cucullate. Elytra of male very much longer than the abdomen, wings as long as elytra, very broad anteriorly. Meso- and meta-notum of female with the hindangles very much produced. Legs short, rather thick. Abdomen of male ovate or suborbicular; of female ovate, dorsal marginal appendages much exceeding the ventral. Supra-anal lamina of male transverse, obtuse; of female quadrate, angles obtuse, subduplicate in the middle or emarginate. Cerci of male about three times as long as the lamina, with ten to twelve joints; of female dilated, shorter than the lamina. Subgenital lamina of male much produced, rounded; styles reflected.

The genus contains only two species, and is limited to Australia. It represents here the *Heterogamidæ*, which it resembles in aspect and habits; the latter being very abundant in Africa,

and extending to the Mediterranean coast, but almost absent from Australia. The descriptions are drawn up from numerous specimens.

ONISCOSOMA CASTANEA, *Brunner* (Syst., 300, fig. 36).

Diploptera silpha, Sauss., Rev. Zool., XVI., 325; *Zetobora granicollis*, Saussure, Melb. Orth., 33, fig. 21, 1862; *Laxta oniscoides*, Walker, Brit. Mus. Cat., 18.

Male.—Dull chestnut or coffee-brown. Head of male blackish-brown or black, shining; antennæ brown; labrum, palpi, and space at base of antennæ yellowish, also the legs and most of the underside. Pronotum of male rounded in front, widest in the middle and angular; foremargin broadly dull-yellowish, with a few dark granulations; sides gradually narrowed to the hind-angles; disk blackish in the middle, sides chestnut, densely granular, with two converging furrows in front, enclosed space raised over the head; quadrilateral area beyond widest behind at the hindmargin. Elytra large, rounded at the apex, veins much raised, irregularly reticulate radial vein black near the base. Wings slightly shorter, border deeply emarginate in the middle, smoky tinted. Scutellum triangular. Abdomen elongated, brownish testaceous, lateral margin narrow, angles obtuse, slightly produced. Supra-anal lamina short, transverse, rounded. Cerci much longer, slender, subterete, acute, hairy. Subgenital lamina subquadrate, shining, exceeding the supra-anal, *unsymmetrical*, the right side deeply emarginate, bordered pale, the left side not; hindmargin rounded, much reflexed; styles very slender, setaceous.

Female.—Broadly oval, outline regular, almost contiguous all round, reddish-chestnut, with numerous, much darker granulations, margins and indistinct longitudinal stripes pale; stigmatic spots, large, black. Head same as male. Pronotum nearly semicircular, hindmargin nearly straight, in the middle slightly and angularly produced, lateral angles obtuse. Lateral margin all round laminar, very broad, hindangles broadly and triangularly produced, very acute behind. Supra-anal lamina flat, very large, keeled, hindmargin rounded, entire. Cerci broad, acuminate, inserted in a narrow space between the produced hind-angles of preceding segment and the lamina, not exceeding either. Last ventral segment shorter, very broad, subtrigonal, sides sinuate, apex broadly rounded.

	Male.	Female.	Larvæ.
Length of body ...	22 mm.	24 –26 mm.	8–18 mm.
Length of elytra...	22–24 "	—	—
Length of pronotum	5– 6·3 "	6 – 7·3 "	2– 5 "
Width of pronotum	9–10 "	11·5–12·5 "	4–10 "

Habitat.—Vicinity of Adelaide, Murray Scrub, Sedan, Kangaroo Island; South Australia. Northern Territory of South Australia. S.A. Museum. Eastern Australia *(Brunner).*

The adults are remarkably uniform in coloration, but the larvæ are very different. They are more or less conspicuously marked by paler and darker longitudinal interrupted stripes, varying according to age or size, and gradually disappear when attaining the adult stage. Walker's description of his *Laxta oniscoides* agrees perfectly with that of a half-grown larva. The insects are numerous in woodlands, hiding under bark, logs, &c., and fly about at night, but do not live in houses. The larvæ appear chiefly in January and February, the adults from May to October, but the latter may be found occasionally all the year round.

ONISCOSOMA PALLIDA, *Brunner* (Syst., 301).

"Testaceous. Pronotum of male brown in the disk, minute brown granules scattered over the major part of the wings. Elytra ample, acuminute, translucent. Female wholly testaceous above, granules black, very much raised, scattered. Abdominal segments appendiculate. Supra-anal lamina emarginate in the middle.

	Male.	Female.
Length of body... ...	21 mm.	23 mm.
Length of elytra ...	26 "	—
Length of pronotum ...	6·2 "	8·2 "
Width of pronotum ...	9·5 "	15 "

Habitat.—New South Wales."

The species differs in the pale colour of both sexes, the ulnar vein emitting bifurcate branches, &c.

PERISPHAERIDÆ, *Brunner* (Syst., 302).

"Head covered. Pronotum of male tranversely lenticular; of female orbicular. Elytra of male perfect; of female absent, rudimentary, or perfect, corneous. Wings, when present, fan-like. Femora spineless; tarsi with arolia. Dorsal abdominal segments truncate behind, angles not produced, not exceeding ventral segments. Supra-anal lamina subquadrate, angles rounded; of female corneous, rounded, entire, not plicate. Cerci of male depressed, longer than lamina; of female short, triangular. Subgenital lamina of male large, with or without styles.

The principal distinctions from the preceding family are that the supra-anal lamina of the female is rounded, and the hind-angles of the abdominal segments are not produced. It is best represented in South Africa, but some species occur also in India, and others in South America.

PERISPHAERIA, *Serville.*

Burm., Handb. II., 483; *Br.*, Syst., 303, fig. 37.

"Males winged, females wingless. Head covered. Pronotum of male lenticular, foremargin semicircular, slightly raised over the head, flat, not gibbous, hindmargin rounded; of female semi-orbicular, truncate behind, not incrassated, or dentate beneath. Elytra of male linear, costal area broad. Wings entire, median vein straight, or decurved at apex. Legs thick. Abdomen ovate, dorsal segments truncate behind, angles obtuse. Supra-anal lamina of male transverse; of female rounded. Cerci of male lanceolate, long, depressed; of female small, conical, inarticulate.

All the typical species (eight) described by Brunner belong to South Africa; those by Walker are Australian.

PERISPHAERIA LAMINATA, *Walker* (Brit. Mus. Cat., 178).

"Black, elliptical, convex, dull, thickly tuberculate above, smooth and shining beneath. Head transversely impressed; base of antennæ, labrum and palpi testaceous; antennæ less than half the length of body. Pronotum semicircular, covering the head, testaceous and sub-hyaline in front (paler beneath), sides flat, hindmargin scarcely rounded in the middle. Meso- and meta-notum much dilated, hindangles elongate, acute. Legs and whole underside tawny. Abdomen with dorsal segments extending beyond the ventral, hindangles slightly elongate, acute. Supra-anal lamina entire. Cerci very short.

Length of body (female)... ... ... 22 mm.

Habitat.—South Australia; West Australia."

No specimen answering to the description has yet been seen. It cannot well be assumed that Walker overlooked the spineless femora, when placing the species here, else one might doubt the position.

PERISPHAERIA FALLAX, *Walker* (ibid, 172).

"Black, fusiform, shining, very convex, roughly punctured Head smooth, extending a little beyond the pronotum, vertex and palpi dark-red. Antennæ longer than half the body, setose, dark-red towards the base. Pronotum parabolic, or short conical, sides rounded, straight behind. Meso- and meta-notum with hindangles hardly elongate. Legs deep-red, short, thick, tibiæ with short spines. Cerci very short.

Length of body (female) ... ... 10 mm. (?)

Habitat.—West Australia."

DEROCALYMMA, *Burmeister.*

Handb. II., 487; *Br.*, Syst., 315, fig. 41.

"Males winged, females wingless. Head wholly covered.

Antennæ extremely slender, half the length of the body. Pronotum with margin acute, incrassated beneath, except over the head. Styles of male absent. Chiefly South African and Indian species.

Derocalymma contigua, *Saussure.*

Mem. Soc. Phys. de Genéve, 1873.

Habitat.—New Guinea.

Ectatoderus, *Saussure.*

Ann. Soc. Ent., France (6), II., 463.

Ectatoderus Noumeensis, *Saussure* (ibid).

Habitat.—New Caledonia.

This genus and species are quoted from the Zoological Record, vol. XIX., 1883.

Heterogamidæ (*Br.*, Syst., 350).

" Head globose, male with ocelli, female with ocelliform spots. Pronotum transverse, pilose, or ciliate. Elytra of male perfectly explicate, anal vein angulose, impressed ; female wingless or perfectly winged ; anal area not folding fan-like, wholly reflexed. Femora unarmed (or the first pair only with a few spinelets), tarsi very long, those of male with arolia, of female without such. Abdominal segments constricted or straight. Supra-anal lamina incised, or plicate and entire. Subgenital lamina of male with styles.

Only two genera of this family are recorded by Brunner. The typical one, with five species, occurs in Africa and the Mediterranean regions, and the other, *Homœogamia*, exclusively in Mexico, and is monotypic. No representatives were hitherto known from Australia. The remarkable species from the western coast of South Australia is so divergent in some characters, that it not only requires a new genus for its reception, but might become the type of a new family when sufficient material becomes available.

The following synopsis will indicate the chief distinctions :—

5.5. Supra-anal lamina of female quadrate, and excised, or broadly subtrigonal, rounded, and entire. Heterogamidæ.

6. Male winged, female wingless.

A. Pronotum rounded in front, truncate behind. Supra-anal lamina quadrate, incised. *Heterogamia*, Burm.

B. Pronotum sinuately rounded in front, produced and broadly rounded behind. Supra-anal lamina broadly subtrigonal, rounded, entire. *Ataxigamia*, gen. nov.

6.6. Both sexes winged. Pronotum truncate in front, rounded behind. Supra-anal lamina quadrate, incised.

Homœogamia, *Burm.*

Ataxigamia, *gen. nov.* (*Ataxia* = confusion).

Male winged, female (?). Head prominent. Pronotum ciliate meso- and meta-notum, also underside of the thorax, coxæ, and femora more or less densely covered with long, silky hair. Pronotum rounded in front, slightly sinuate on each side of the hood-like middle part, gradually narrowing rearward, produced behind, apex broadly rounded; sides much deflexed anteriorly, margin slightly rough, disk with coarse, shallow impressions. Elytra and wings large, perfectly folded; elytra acuminate; wings with anal area fan-like. Legs and tarsi long and slender, claws small, arolia minute. Abdomen very much depressed, segments scarcely constricted, angles not produced, obtuse or rounded. Supra-anal lamina subtrigonal, hindmargin rounded, entire, nearly flat. Cerci very much longer than lamina, subterete, 16-jointed, finely pilose, obtuse. Subgenital lamina exceeding the upper, broad, hindmargin emarginate.

In the "Archiv für Naturgeschichte" Gerstäcker also describes a genus *(Gynopeltis)*, in which the fore femora alone are spined (Zool. Rec., VI., 461, 1864).

Ataxigamia Tatei, *spec. nov.*

Pale brownish-ferruginous, underside of body and the legs pale ferruginous-testaceous. Head pale, face hairy; antennæ brown, basal joints pale. Pronotum pale in front, dark behind. Elytra reddish-brown along the costa and at the base, paler beyond, veins with narrow deep-brown margins, veinlets whitish. Wings before the middle and all longitudinal veins smoky-brown, pale beyond, transverse veinlets whitish. Anterior femora with four spinelets, middle and hind femora unarmed. Styles inserted near posterior margin of subgenital lamina, very short, slender.

	Male.
Length of body	27 mm.
Length of elytra	35 "
Length of pronotum	8 "
Width of pronotum	11·5 "

Habitat.—Fowler's Bay, western coast of South Australia (legit Prof. R. Tate). S.A. Museum.

The principal aberrant characters consist in the fore femora alone bearing spines, the anal area of the elytra being narrow, and longer than in any other species, the anal area of the wings folding flabellately, and the supra-anal lamina being entire, rather long, and nearly flat.

B. Claws without arolia.

Panesthiidæ (*Br.*, Syst., 384).

Head large, very broad, antennæ shorter than body, rather

thick. Pronotum semiorbicular, not quite covering the head, truncate in front, or emarginate in the middle ; disk more or less excavated. Elytra perfect, corneous, shining, constricted in the middle, or abbreviated, or none. Legs stout, femora unarmed, or the anterior ones only with a few teeth in some species ; claws large, arolia none. Abdomen thick, hindangles of dorsal segments obtuse. Supra-anal lamina broad, rounded. Subgenital lamina of male rounded or transverse, very narrow.

The family comprises four genera, each with only a few species, two being wholly or chiefly American, the others Indian and Australian ; and is the last in Brunner's system of the Blattariæ.

Panesthia, *Serville.*

Ann. Sc. Nat. Zool., XXII., 1831 ; *Br.*, Syst. 390, fig. 58.

"Black, very shining. Head large ; antennæ thick, scarcely longer than the pronotum. Pronotum transverse, emarginate and raised over the head, margins broad, disk more or less deeply excavated, and tuberculate. Elytra with costa more or less suddenly deflexed, constricted beyond the costal area leaving the sides of the abdomen and the scutellum visible ; veins indistinct except in the radial and anal areas. Coxæ and femora very thick, tibiæ with long spines. Abdomen very convex, coarsely punctured dorsally. Supra-anal lamina very broad. Cerci triangular, very short. Subgenital lamina of male small, transverse, without styles.

Of the species recorded by Brunner one is Australian, the others are from the Malay Archipelago, two of them, however, have since been proved to extend to the Northern Territory of South Australia, by specimens in the collection of the S.A. Museum.

Panesthia morio, *Burmeister.*

Hardb., II., 513; *Br.*, Syst., 392.

Body deep-black. Head black ; *ocelli, a band across the face, margin of labrum*, and *palpi* (partly) *yellowish ;* antennæ moniliform, *reddish.* Pronotum with frontal incision acute, margins deflexed, bi-tuberculate. Elytra *deep-brown*, veins distinct, pale, parallel towards apex. Legs *piceous* to *brown ;* fore femora ciliate, unarmed. Abdomen with last dorsal segment laterally dentate. Supra-anal lamina crowdedly toothed.

Female.	Brunner.	S.A. Mus.
Length of body... ...	33–52 mm.	36 mm.
Length of elytra ...	37 " (?)	39 "
Length of pronotum ...	8–12 "	12 "
Width of pronotum ...	12·5–18"	12 "

Habitat.—Java, Ceylon, Amboina *(Brunner);* Northern

Territory of South Australia *(S. A. Museum);* New South Wales, Lord Howe Island *(Walker).*

The specimen from which the above description was drawn up was presented by the Hon. S. Magarey in 1886, and differs only in the italicised particulars from Brunner's description.

PANESTHIA JAVANICA, *Serville* (loc. cit.).

Br., Syst., 393, fig. 58; *P. affinis*, Burm.; *P. æthiops*, Stăl; *P. quadrimaculata*, Walk. (larva).

"Black, very shining. Pronotum of male deeply and broadly incised in front with horn-like angles, middle dentate; incision of female triangular, sides and middle dentate. Elytra longer than the body, very shining, veins indistinct. Abdomen with last segment entire, hindangles produced, tooth-like. Supra-anal lamina denticulate. Larva with four spots.

	Male.	Female.
Length of body	31–45 mm.	42 mm.
Length of elytra ...	24–37 "	33 "
Length of pronotum ...	6–10 "	9 "
Width of pronotum ...	10–16 "	14 "

Habitat.—Java, Philippine Islands, Cambodia, Birma *(Brunner);* India, Australia *(Walker*, Brit. Mus. Cat., 20)."

PANESTHIA TRANSVERSA, *Burm.*

Handb. II., 513; *Br.*, Syst., 395; *P. plagiata*, Walker (Brit. Mus. Cat., 21).

Black, shining. Pronotum with frontal incision of male deep, sides and middle horn-like elevated; of female much less deep, lateral and medial tubercles tooth-like, disk deeply excavated anteriorly, a curved transverse ridge behind the depression. Elytra with the costal area suddenly abbreviated before the middle, much narrowed beyond, margin dusky yellowish; a broad, interrupted, oblique yellow band before the middle.

	Male.	Female.
Length of body	25 mm.	30 mm.
Length of elytra	22 "	23 "
Length of pronotum ...	5·5 "	6 "
Width of pronotum ...	9·5 "	10 "

Habitat.—Java (*Burm.*); Ceylon (*Walker*); Northern Territory of South Australia.

The specimen of a male from which the description and measurements have been supplemented, was captured by my brother, Mr. J. P. Tepper, near Port Darwin, about 1874.

PANESTHIA AUSTRALIS, *Brunner* (Syst., 396).

Deep black; part of the underside brown. Pronotum of male

emarginate in front, margin incrassated, reflexed, disk with trifoliate excavation and four tubercles in the angles; of female subemarginate, margin not incrassated, or reflexed, disk almost flat, impression triangular, small. Supra-anal lamina with hind-margin entire. Elytra and wings of male much abbreviated, scarcely attaining the hindmargin of the metanotum, veins distinct; of female lobiform, almost obsolete.

	Male.	Female (*Br.*)	Male.	Fm. (*mihi*).
Length of body ...	31 mm.	28 mm.	29 mm.	28 mm.
Length of elytra ...	?	?	8 "	7 "
Length of pronotum	7 "	6·2 "	6·5 "	6 "
Width of pronotum	11 "	9 "	11 "	9 "

Habitat.—Sydney, New South Wales; Moreton Bay, Queensland (*Brunner*); Ardrossan, Yorke's Pen., South Australia (*Cadd*); Kewell, N.W. Victoria (*Jas. Hill*).

I observed and collected this species already in 1898-80, usually at the foot of perpendicular faces of cliffs along the seashore, but beyond the direct action of the waves, either embedded in the loose abraded detritus or concealed under clods of earth and in fissures. The insects were, however, by no means abundant. The female specimen from Kewell (200 miles inland) appears to be a nymph, the elytra and wings being lobiform and not free, of nearly equal length. The former extend barely to the hind-margin of the metanotum, the latter to that of the second abdominal segment, both with the veins quite distinct.

Respecting the elytra and wings of the adults, Brunner remarks that they were mutilated in his specimens, but of the ordinary type. This appears not to be the case either in regard to the mutilation or that they ever have perfect organs of flight. The adult male specimen in the collection of the S.A. Museum presents also a *mutilated* appearance, but when closely examined with a strong lense it is seen that the edges of elytra and wings are quite smooth, and rounded, notwithstanding their broken appearance, and it is my opinion that this is their normal form.

Panesthia cribrata, *Saussure* (Rev. et Mag. Zool., 1864, p. 31), Australia.

Panesthia Kraussiana, *Saussure* (Mem. Soc. Phys. de Genéve, 1873).

Habitat.—Melbourne, Victoria.

Panesthia laevicollis, *Saussure* (ibid).

Habitat.—Australia.

On a New Mineral (Stibiotantalite).

By G. A. Goyder, F.C.S., Assayer, School of Mines.

[Read April 4, 1893.]

Some samples of this mineral were given to Mr. J. J. East, Registrar of the School of Mines and Industries, by Mr. Knox Brown, of Bunbury, West Australia, the latter explaining that although the sluiced tin-ore from the alluvial at Greenbushes appeared to the miners of a fair, even character as regards freedom from associated minerals, the assay values from Melbourne varied in a most irregular manner. Mr. East's attention was taken with part of the sample submitted, which had been called locally "pale tin" and "resin tin." On being submitted to a preliminary examination in the School Laboratory this was found to contain antimony, but did not appear to have the properties of any of the ordinary antimonial minerals.

Mr. East then handed it to me for analysis, the result of which was as follows:—

Tantalic acid, Ta_2O_5	51·13	per cent.
Niobic acid, Nb_2O_5	7·56	"
Antimony oxide, Sb_2O_3 ...	40·23	"
Bismuth oxide, Bi_2O_3	0·82	"
Nickel oxide, NiO	0·08	"
	99·82	"

From the above analysis it appears that the mineral consists essentially of tantalate of antimony, part of the tantalic acid being replaced by niobic acid, and part of the antimony by bismuth.

No record could be found in any of the text-books of mineralogy of any mineral constituted as above, and in none of the published analyses of the tantalates is there a trace of antimony reported.

Physical Properties, &c.

The specific gravity of different samples of the mineral was found to vary from 6·47 to 7·37, the latter being the S.G. of the sample analysed. All the specimens were waterworn, and although some of them, if not all, were crystalline, the form could not be determined. Fracture uneven to sub-conchoidal

with an adamantine lustre, which, after long exposure, appears resinous. Hardness, 5 to 5·5. Brittle. Infusible, and on charcoal *per se* yields only a faint sublimate. With soda on charcoal easily reduced to metallic antimony, the tantalic acid forming a fusible slag with the soda.

An analysis of the specifically lighter portion is being made, and I anticipate that this will contain a larger proportion of niobic acid, if indeed it should not prove to be principally a niobate.*

I propose the name of "Stibiotantalite" for this new mineral-species, which is expressive of its chemical composition.

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* The analysis of the second sample has been completed, and the lighter specific gravity found to be caused by an intermixture of impurities, principally silica; the relative quantities of tantalic and niobic acids and oxide of antimony being approximately the same as in the foregoing analysis.—G. A. G., April 24, 1893.

A New Parasite of the Black Scale (Lecanium testudo).

By J. G. O. Tepper, F.L.S., &c.

[Read April 4, 1893.]

The Black-scale is well-known as a most annoying and often destructive insect of the Coccidæ, attacking many trees and garden plants, such as Dodonaea, Abutilon, Tecoma, Pelargonium, Wormwood, &c. The eggs hatch in January and February, when the minute, almost microscopical larvæ spread rapidly over the plants, actively assisted by the ants, which usually denote their whereabouts. From this time, and after fixing themselves to certain spots, they grow rapidly till attaining the full size of about one-sixth inch diameter, exhausting the plants by sucking. On January 22nd last, Mr. Edwin Smith brought to me at the Museum some live adult scale-insects and two lively little pale caterpillars he said he had found with them. Not being able at the time to identify them, the scales and the larvæ were put by themselves in a box, covered with glass, and almost forgotten for some time. The latter, however, in a week or two had disappeared. On March 31, on again examining the box two moths were found to have hatched from as many cocoons of white silk concealed under the dark empty shells of the scale-insects.

These were identified by Mr. H. H. Lower, jun., as *Thalpochares dubia*, Butler, of which the food or host had not been known. This is, therefore, another lepidopterous larvæ convicted of carnivorous habits. Its near relation, *Thalpochares coccophaga*, Meyr., is known to feed upon *Eriococcus eucalypti*, the small white-scale; which produces the silky appearance of the Redgum Eucalypts in our Park Lands, and usually but erroneously ascribed to various other causes.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read April 4, 1893.]

XIII.

The following pages furnish descriptions of new species, for one of which I have found it necessary to propose a new generic name. They also contain a number of notes on synoymy, &c.

LAMELLICORNES.

PSEUDORYCTES.

P. Mullerianus, White. I have recently seen several examples (all males) of a *Pseudoryctes*, all of which I believe to belong to this species, although they differ considerably in size and in the degree of development of the male characters. In one example the horns of the prothorax are longer than in the others, the middle horn being bifid at the apex. These specimens all come from North Queensland, and (except one generously presented to me) are in the cabinet of Mr. French, of Melbourne.

BUPRESTIDÆ.

PARACEPHALA.

P. cyaneipennis, sp. nov. Sat elongata; subcylindrica; subnitida; ænea, elytris sat læte cyaneis; subtus pilis albidis vestita; capite longitudinaliter sat profunde canaliculato sat crebre striatim ruguloso; prothorace transversim ut caput ruguloso, quam longiori dimidio latiori, inæquali (transversim et longitudinaliter plus minusve sulcato et pone medium in disco obscure 2-tuberculato); elytris crebre subtiliter granuloso-rugulosis, postice singulatim rotundatis et obscure crenulatis. Long., 4 l.; lat., $1\frac{1}{3}$ l.

Apart from colour, this species differs from that which I take to be *P. murina*, Thoms. (and also from *P. ænea*, Blackb.), by the much deeper frontal sulcus of its head. In this character it agrees with *P. pistacina*, Hope.

New South Wales; Sydney; bred by Mr. Froggatt from galls on *Casuarina distyla*.

CLERIDÆ.

AULICUS.

A. parvulus, sp. nov. Nitidus; setis elongatis vestitus; obscure cyaneus, elytris æneis, antennis palpisque testaceis, pedibus piceis (tibiis tarsisque anticis rufescentibus); capite antice crebre postice sparsim punctulato; prothorace quam longiori vix latiori sparsim punctulato; elytris crasse (ad basin et ad apicem minus crasse) subseriatim punctulatis transversim fortiter rugulosis. Long., $2\frac{2}{5}$ l.; lat., $\frac{4}{5}$ l.

This species is characterised by small size, unusual colours (general colour cyaneous, elytra of a bright bronzy tone, antennæ testaceous, legs piceous), and extremely coarse puncturation of elytra, which is only a little less coarse about the base and apex, and which does not run very distinctly in rows owing to the coarseness of the transverse rugulosity.

Victoria; sent to me by Mr. Lower.

BOSTRYCHIDÆ.

XYLOPERTHA.

X. canina, sp. nov. Femina (?). Brevis; cylindrica; minus nitida; picea, prothorace elytrisque antice et pedibus rufescentibus, antennis testaceis; capite sat elongato, longe setoso, postice longitudinaliter sat crebre strigato; antennis prothorace vix brevioribus; prothorace elytrorum latitudine quam longiori parum latiori, antice sat angustato, postice sparsius minus subtiliter punctulato, antice crebre granulato-ruguloso tuberculis nonnullis majoribus intermixtis (præcipue latera versus), utrinque unco supra oculum armato; elytris confertim sat fortiter punctulatis, inter sculpturam fortiter rugatis, postice subito oblique declivibus; elytrorum parte declivi plana fere circulari, carina circumcincta, apice deorsum producta, sutura utraque carinata et in medio ut spina elongata (hac ad apicem extrorsum curvata) retrorsum producta, humeris lævibus. Long., $1\frac{3}{5}$ l.; lat., $\frac{7}{10}$ l.

Viewed from the side this species has a rough resemblance in outline to a dog, the spines protruding from the apical declivity appearing as a single projection, and representing the animal's tail. It is evidently congeneric with the species that I described in Proc. L.S., N.S.W., 1889, pp. 1264, &c., as *Xylopertha*. As I am not sure of the sex of the example before me, and do not see any immediate prospect of obtaining more specimens, I think it is well to describe it, notwithstanding that I think it probably a female (on account of its front tarsi not being clothed with long

hairs as they are in the only congeneric example I have seen, that I feel sure is a male).

N.S. Wales; Blue Mountains.

TENEBRIONIDÆ.

DOCALIS.

D. maculatus, sp. nov. Sat elongatus; sat parallelus; nigro-piceus, elytris pone medium macula obscura ferruginea ornatis; setis brevibus erectis nigris et nonnullis adpressis pallidis vestitus, his maculatim sat crebre condensatis; capite prothoraceque confertim sat subtiliter granuloso-punctulatis; hoc inæquali postice leviter angustato, lateribus leviter subconcavis; elytris sat fortiter striato-punctulatis, interstitiis alternis quam cetera latioribus. Long., $2\frac{1}{5}$ l.; lat., $\frac{7}{10}$ l.

N.S. Wales; Blue Mountains.

COTULADES.

C. montanus, sp. nov. Niger, prothorace albo-bivittato, pedibus rufis; supra setis validis sat brevibus vestitus, his in elytrorum costis hic illic fasciculatis; capite prothoraceque crassissime punctulatis, puncturis singulis setis singulis granuliformibus instructis; elytris seriatim crassissime profunde punctulatis et sub-tricostatis. Long $1\frac{1}{5}$ l.; lat., $\frac{3}{5}$ l.

This minute species is among the smallest of the *Tenebrionidæ*. It seems to be near *C. fascicularis*, Pasc., but is much smaller, with red legs and a fairly well-defined vitta (formed by white setæ) of a somewhat curved form on either side the middle line of the prothorax, &c.

N.S. Wales, Blue Mountains.

MENEPHILUS.

M. sydneyanus. Elongatus, sat parallelus; sat nitidus; niger nonnullorum exemplorum antennis pedibusque picescentibus; capite crebre subtilius punctulato, fronte sat fortiter longitudinaliter impresso; prothorace leviter transverso, ante basin transversim leviter impresso et ad basin utrinque foveolato, a basi antrorsum (leviter arcuatim) parum angustato, margine antico bisinuato et in medio minute leviter emarginato, angulis omnibus acutis sat productis; elytris quam prothorax haud multo latioribus, leviter striatis, striis sat fortiter punctulatis, interstitiis subtilissime punctulatis, angulis humeralibus fere rectis.

Mas. Tibiis anticis ad apicem intus fortiter curvatis. Long., $4\frac{4}{5}$—5 l.; lat., $1\frac{3}{5}$—$1\frac{4}{5}$ l.

The prothorax not narrowed and laterally sinuate behind and

also the more convex build gives this species an appearance somewhat different from those of the Australian species known to me that have been attributed to *Menephilus*, but I cannot find any character whereby to distinguish it from them (e.g., *M. colydioides*, Er.).

N.S. Wales, near Sydney; also in the Blue Mountains.

CISTELIDÆ.

ALCMÆONIS.

A. punctulaticollis, sp. nov. Sat elongata; capillis erectis albidis nonnullis vestita; niger, (exempli typici) prothorace elytrisque læte purpureis, labro mandibulis palpis antennarum basi pedibusque læte testaceis; capite sat fortiter, prothorace multo minus fortiter, crebre punctulatis; elytris punctulato-striatis, interstitiis sat convexis et inæqualiter punctulatis.

Mas. Antennis quam corporis dimidium sat longioribus; femoribus compressis, posticis subtus (in medio angulatim) dilatatis, tibiis posticis intus planatis et fortiter bisinuatis.

Femina latet. Long., $4\frac{1}{5}$ l.; lat., $1\frac{1}{5}$ l.

This species seems to present the feeble distinctions from *Atractus* on which the genus *Alcmæonis* was established. It appears to differ from *A. pulchra*, Bates, considerably in color, the prothorax of that species being described as castaneous with some black markings, and the elytra as green with purple reflections and silky golden pubescence, whereas in the present insect the prothorax and elytra are of uniform bright purple color and the thinly dispersed hairs on the latter are whitish. The prothorax of *A. pulchra* is said to be longer than wide, whereas that of *A. punctulaticollis* is (by measurement) slightly wider than long. Even if it should prove to be a variety of *A. pulchra*, it seems desirable that the present insect should be described, as no description has hitherto appeared of a male *Alcmæonis*.

Victoria; Alpine district.

LICYMNIUS.

L. bicolor, sp. nov. Mas. (?). Elongatus; breviter minus crebre pubescens; niger vix cyaneus, prothorace læte rufo, palpis femorum anticorum basi et genubus omnibus rufescentibus; capite fortiter minus crebre punctulato; prothorace leviter transverso, longitudinaliter vix impresso, ante basin mediam leviter foveolato, subfortiter minus crebre punctulato, antice angustato, lateribus leviter arcuatis, basi manifeste sinuata, angulis posticis distinctis obtusis; elytris ad basin quam prothoracis basis haud multo latioribus, suturam versus

manifeste latera versus haud manifeste striatis, fortiter (fere ut caput) crebre punctulatis, puncturis subseriatim dispositis; antennis sat elongatis sat compressis; tibiis anticis leviter flexuosis. Long., $2\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

S. Australia; Adelaide District.

ANAXO.

A. sydneyanus (? *æreus*, Blackb., var.). Femina. Ab *æreo* differt prothoracis lateribus paullo minus arcuatis, antennis (nonnullorum exemplorum articulo 2° rufescenti excepto) totis nigris.

I took three specimens of this insect on flowers near Sydney, and am in doubt whether it should be regarded as a distinct species or merely a local race of the Victorian *A. æreus*, Blackb. I have seen a good many females of the latter, in all of which the antennæ have all the joints, except the first and the apical two or three, bright-red in their basal half (in some specimens almost entirely red), while in all these Sydney examples the antennæ are quite black, except that in one of them the second joint is a little reddish, the sides of the prothorax at the same time being certainly straighter, which makes that segment appear a little more elongate. Since I described *A. æreus* I have obtained a specimen which I regard as the male of that species. It differs from the female in being much smaller (long., $3\frac{1}{4}$ l.), and in having its antennæ and femora black, and its hind tibiæ considerably dilated. It must be remarkably like the insect which Mr. Bates described as *Chromomæa unicolor*, but it is certainly, I think, the male of *Anaxo æreus*, and I feel convinced that *A. æreus*, female, cannot be separated generically from *A. brevicornis*, Bates (the type of the genus), of which its author says that he had seen only the female—indeed, *A. æreus* and *brevicornis* are very close even as species, though certainly distinct.

PYTHIDÆ.

TRICHOSALPINGUS.

T. obscurus, sp. nov. Oblongo-ovatus; minus nitidus; subtiliter pubescens; crebre (prothorace minus crebre) punctulatus; obscure brunneus, tarsis testaceis; antennis prothoracis basin attingentibus; prothorace quam caput vix latiori, sat transversim quadrato, ante basin utrinque leviter impresso; elytris quam prothorax basi multo latioribus, a basi longe ultra medium leviter dilatatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l.

Very like *T. brunneus*, Blackb., but much smaller, differently coloured, and having the puncturation of the prothorax much less crowded, and the basal impressions of the same very much feebler.

N.S. Wales; Blue Mountains.

ŒDEMERIDÆ.

PSEUDANANCA (*gen. nov.*).

Palporum maxillarium articulus apicalis magnus securiformis; labrum transversum antice subtruncatum; caput antice paullo elongatum; oculi magni prominuli rotundati sat grosse granulati; antennæ prope oculos insertæ, 11-articulatæ (?), capillis elongatis erectis vestitæ, articulis 4-10 (?, articulis 10°, 11° que exempli typici amissis) intus ante apicem sat fortiter angulatim productis; prothorax subcylindricus; elytra sat elongata, coxæ intermediæ et posticæ minus inter se approximatæ; tibiæ vix manifeste ad apicem spinosæ; tarsi sat graciles, articulo penultimo subtus sat fortiter sat anguste producto, intermediis subtus capillis perlongis vestitis; unguiculi fere simplices, ad basin paullo dilatati; corpus breviter pubescens.

The very small heteromerous beetle for which I propose this new name is difficult to place satisfactorily. The following characters in combination seem, however, to point to the *Œdemerides* as its allies, viz., anterior coxæ strongly prominent and open behind, claws simple (or nearly so), eyes entire, head not narrowed into a distinct neck behind the eyes, penultimate joint of tarsi strongly produced under the apical joint, hind coxæ considerably separated from each other. The most puzzling character is the very considerable separation *inter se* of the intermediate coxæ, which, however, are shaped as those of *Ananca*. In some respects this species seems to be near *Ithaca*, Olliff, but it cannot be referred to that genus, even if it be a female (though I think it is a male) on account, *inter alia*, of the penultimate joint of its tarsi not being bilobed. It is an elongate insect of decidedly *Œdemerid* facies.

P. ruficollis, sp. nov. Sat elongata, minus parallela, breviter subtiliter pubescens; sat opaca; nigra, prothorace femorum basi tibiis tarsisque (his 2 plus minusve infuscatis) rufis, antennis basin versus picescentibus; supra sat æqualiter sat crebre sat fortiter punctulata; capite (oculis inclusis) quam prothorax paullo latiori; hoc leviter transverso subcylindrico supra inæquali; elytris quam prothorax duplo latioribus; antennis quam corporis dimidium sat longioribus; metasterno crasse fortiter sat crebre, abdomine minus fortiter magis crebre, punctulatis; femoribus posticis (? maris) a basi fere ad apicem albidis et confertim pubescentibus. Long., $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l.

N.S. Wales; Blue Mountains.

SESSINIA.

S. sublineata, Waterh. I have a short series (taken on flowers

on the Blue Mountain range) of a species which I cannot separate from the Tasmanian *S. sublineata*. It is, however, considerably smaller, the largest examples being less than two and a-half lines long.

MORDELLIDÆ.

MORDELLA.

M. inusitata, sp. nov. Dense cinereo-pubescens; capitis pube in disco infuscata, prothoracis longitudinaliter in medio infuscata, elytrorum antice maculatim et in parte dimidia postica tota (fascia ante-apicali angusta excepta) infuscata; pedibus anterioribus 4 testaceis, tarsis posticis antennisque rufescentibus; aculeo et abdominis apice nigris; prothorace quam longiori sat latiori. Long., 2 l.; lat., $\frac{4}{5}$ l.

A peculiarly coloured species devoid of the shining sericeous tone so usual in the genus. The whole insect is densely clothed with ashy pubescence, which is somewhat variably shaded in certain parts to a more or less dark-brown colour; this dark-brown shading occupies the greater part of the hind half of the head; it forms two narrowly separated lines down the middle of the prothorax; and on each elytron it appears as three elongate spots side by side close to the base, an indistinct narrow zigzag fascia a little behind the spots, a well-defined wide fascia immediately behind the middle, and a variable blotch or cluster of spots filling up the greater part of the apical fifth-part, and separated from the post-median fascia by a narrow zigzag fascia-like interval of the general pale-ashy colour.

This insect perhaps resembles *M. mixta*, Fab., but I do not think it can be identical with it, as that species is said to be "major," and is described as having a *black* ("atra") spot on either side of the prothorax, and a *red* fascia on the elytra. Also perhaps resembles *M. promiscua*, Er., which species, however, is said to have black legs and antennæ, and black tomentum on the sides of the prothorax and of the abdomen, &c., &c.

N.S. Wales, Sydney; on flowers.

M. maculatissima, sp. nov. Robusta; nigra; dense nigro-pubescens; supra maculis parvis plurimis albido-pubescentibus ornata, corpore subtus plus minusve albido-pubescenti, ore et antennarum basi læte rufis; prothorace quam longiori sat latiori. Long., $3\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

A fine robust species, above the average size. The prothorax and elytra are covered with a large number of small spots, formed by white pubescence (there are at least 40 on each elytron), some of which coalesce here and there, forming larger spots. Probably this coalescence of the spots is variable; in the typical specimen those along the base of the elytra are a good

deal (but irregularly) run together, those near the suture a little behind the scutellum coalesce into a kind of common cluster, and two or three coalesce near the apical part of the lateral margins, the larger spot thus formed being isolated on one elytron and on the other sending out an extension (*i.e.*, running into another spot), which is almost connected with a spot close to the suture. The pubescence of the head, legs, and undersurface appears to be black or whitish, according to the point from which it is looked at.

This species is probably near *M. pulverulenta*, Macl., from N. Queensland, which seems to be the only other described Australian species with the markings of the upper surface consisting of a great number of small white spots (*M. multiguttata*, Waterh., is described as having only seven spots, and those yellow, on each elytron). *M. pulverulenta* appears to be a much smaller species (long., 2 l.), and is described (its white pubescence excepted) as entirely black, saving the front legs, piceous. As the front legs of the present species are of the same blackish color as the other legs, and the mouth and base of the antennæ are bright red, it may be assumed that these characters, together with the very different size and habitat, point to specific distinctness.

N.S. Wales; on flowers near Sydney.

M. cara, sp. nov. Nigra; dense nigro-pubescens; capite prothorace postice et ad latera, elytrorum basi (hac anguste) sutura antice macula ovali discoidali (hac paullo pone basin posita) macula antemediana (hac V reversam simulanti) et macula transversa ante apicem posita, læte aureis; corporis subtus lateribus abdominis maculis parvis lateralibus tibiisque posticis argenteis. Long., 2 l.; lat., $\frac{4}{5}$ l.

It seems impossible to find any distinctive characters for many of the very numerous Australian species of *Mordella* apart from colour, markings, and size, all of which, however, as far as my observations go, appear to be fairly constant. Of the present species I have seen several examples all quite identical. Their distinctive characters appear to be *(a)* strongly contrasted silvery pubescence of the under surface, and golden of the upper; *(b)* conspicuous golden colour of the front one-fifth part of the suture; *(c)* the sharply-defined brilliant golden spot near, but not joined to, the base on the disc of each elytron; *(d)* the entire absence of any rufous colouring of the legs and antennæ, even the latter scarcely tending to a piceous tone—this, however, being possibly only sexual.

N.S. Wales; near Sydney.

M. sydneyana, sp. nov. Nigra; dense nigro-pubescens; capite, prothorace (linea media et macula utrinque exceptis),

elytrorum basi anguste sutura antice macula elongata discoidali basin attingenti macula antemediana lunata et macula postmediana rotundata læte argenteis; corpore subtus (certo adspectu) toto argenteo-pubescenti; ore palpis antennarum basi et femoribus anticis rufis. Long., 2 l.; lat., $\frac{4}{5}$ l.

This species is near *M. communis*, Waterh., but is narrower and more elongate, and with markings so different that even if the discovery of intermediate forms should bring the two together it would be convenient to call it by a distinctive name. The silvery markings of the elytra are extremely sharply defined and conspicuous, consisting of a short narrow vitta on the front part of the suture, and on each elytron the following:—A short wide vitta running hindward from the middle of the base, a semilunar spot (its convex side forward) close in front of the middle, and a round spot distant from the suture considerably in front of the apex. The markings differ from those of *communis* in there being no isolated spot behind the base, in a large semilunar spot taking the place of the two small spots in front of the middle, and in the hindmost spot being larger, rounder, not nearly so close to the suture, and not quite so near the apex. This is not the "var. ?" of *communis* from Sydney mentioned by Mr. Waterhouse (Tr. E. S., 1878, p. 231).

N.S. Wales; near Sydney.

M. Baldiensis, Blackb. (Tr. R. Soc. S.A., 1891, p. 341). I have taken specimens of a *Mordella* near Sydney, and also on the Blue Mountain Range, which I cannot separate from this Victorian species except by their very small size (long., 1 l.). I suspect, however, that they represent a distinct species, especially as some examples have the antennæ and front legs decidedly rufescent—probably a sexual character which I find scarcely marked in *Baldiensis*.

PHYTOPHAGA.

CHEILOXENA.

C. Frenchæ, sp. nov. Elongata; convexa; opaca; picea, squamis piliformibus griseo-brunneis (his in prothorace crebre, in elytris minus crebre-sed hic illic maculatim condensatis—dispositis) vestita; prothorace quam latiori fere longiori, utrinque ante medium crista insigni ornato, ad latera haud dentato; elytris subfortiter vix seriatim punctulatis, tuberculis sat numerosis ornatis (ex his in utroque elytro quam ceteri magis insignes quinque—sc. alio humerali, alio subbasali prope suturam, alio antemediano prope suturam, aliis 2 fere contiguis transversim positis postmedianis). Long., 7 l.; lat., 3 l.

This extremely distinct species was taken by Mrs. French, of Melbourne. As will be seen by the above description, it is so distinct from *C. Westwoodi*, Baly, that it can hardly be necessary to specify the difference. The prothorax is of very peculiar form, an ill-defined ridge commencing near the base on either side, very wide of the middle line, and running obliquely forward for a certain distance, until its direction (near the front) becomes parallel to the middle line, and at the same place the ill-defined ridge changes into a very strongly elevated crest. The base of the elytra is nearly twice as wide as the widest part of the prothorax. The absence of lateral teeth from the prothorax is noteworthy, as M. Lacordaire regards their presence as a generic character. There is, however, no doubt about this insect being congeneric with *C. Westwoodi*.

Victoria; Latrobe R. District.

MICRODONACIA (gen. nov. *Donacidarum*).

Gen. *Donaciæ* affinis; differt capite antice minus productum, femoribus minus elongatis sat incrassatis, unguiculis parvis appendiculatis divaricatis.

The minute insect for which I propose this new generic name is certainly, I think, very close to *Donacia*. I have not been able to devote a specimen to dissection, and so am not able to state positively that the parts of the mouth requiring dissection for their examination (*e.g.*, the ligula and mentum) are exactly as in *Donacia*, but with this reservation, the characters of *Donacia* given by Dr. Chapuis (Gen. Col., X., p. 57), with the exceptions noted above, are the characters of the present species. It may be at once distinguished among the *Phytophaga* by the following characters in combination:—Long slender antennæ inserted well in front of the eyes and notably nearer to the centre line of the head than is the inner margin of the eyes, base of prothorax much narrower than base of elytra, prothorax not distinctly margined laterally, anterior coxæ almost contiguous, claws appendiculate.

M. incerta, sp. nov. Colore variabilis, testacea vel brunnea plus minus æneo-vel viridi-micans; minus nitida; sat elongata; capite prothoraceque fortiter crebre sat rugulose punctulatis; illo sat brevi sat æqualiter leviter convexo; oculis modice convexis, quam antennarum articulorum 3^{i} 4^{i} que conjunctorum longitudine fere magis inter se remotis; antennis quam corporis dimidium (maris multo, feminæ vix) longioribus, articulo basali sat incrassato, 2° 3° que brevioribus inter se æqualibus, 4° quam basalis longiori, ceteris inter se et basali longitudine subæqualibus; prothorace vix transverso, ante basin transversim subsulcato, antice quam postice vix

latiori, lateribus antice subtiliter submarginatis mox ante medium fortiter angulatim dilatatis; elytris trans humeros quam prothoracis basis fere duplo latioribus, setis erectis sparsim vestitis, sat fortiter punctulato-striatis, interstitiis sublævibus; pedibus minus elongatis; femoribus sat dilatatis, anticis dente sub obsoleto intermediis dente sat perspicuo posticis dentibus 2 magnis (his transversim positis) subtus armatis; tibiis sinuatis ad apicem subdilatatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{1}{2}$ l. (vix).

Victoria; in marshy places on the higher mountains of the Alpine district.

CRYPTOCEPHALUS.

C. Chapuisi, Baly. This species is certainly, I think, the same that Dr. Chapuis named *C. iridiventris*. I have been able to examine a type from Dr. Chapuis' collection through the courtesy of M. Severin, of Brussels. The two descriptions are in almost identical language. They were published in the same year (1877), Dr. Chapuis' apparently before Mr. Baly's. I think this synonymy has not been previously noted.

EROTYLIDÆ.

LANGURIA.

L. Vandepolli, Fowler. There can hardly be a doubt that this species was founded upon the insect which von Harold had previously described as *L. vulgaris*. I believe this synonymy has not yet been recorded.

COCCINELLIDÆ.

RHIZOBIUS.

R. major, Black. In Trans. Roy. Soc. S.A., 1892, p. 253, line 11, for "general form" read "pubescence."

R. cærulens, Blackb. This name was incorrectly printed, *R.* "*cærulens*," *vide* Tr. Roy. Soc., S.A., 1892, p. 256.

GYMNOSCYMNUS.

G. quadrimaculatus, Blackb. In describing this species (op. cit., p. 242) I accidentally omitted to say that it is found in N.S. Wales.

Descriptions of a New Genus and Five Species of Australian Nitidulidæ and Colydiidæ.

By E. Grouvelle.

[Read April 4, 1893.]

[This memoir is founded on certain species that I forwarded to M. Grouvelle, the eminent French coleopterist, who has made a special study of the group of families generally known as *Clavicornes*. I was unable to refer them to any known genera, but as many of the genera in this group of families are of very wide distribution, I deemed it safer to place them in the hands of a high authority, who is a specialist on the *Clavicornes* of the world, than to risk the possibility of my overlooking their connexion with some existing genus of which I had not seen a type. M. Grouvelle finds them all to be new species, and is able to refer confidently to existing genera only three of them. I have at least one example of them all in my collection. M. Grouvelle has taken the opportunity of this memoir to describe an additional new species from Australia in his own collection.—T. Blackburn.]

NITIDULIDÆ.

Ericmodes* australis, *n. sp.*

Oblongo-elongatus, convexus, griseo-pubescens, fulvo-ferrugineus, antennis pedibusque dilutioribus, elytris nigro-maculatis; capite prothoraceque crebre punctatis, fronte convexiuscula; prothorace transverso, antice et postice coarcto; lateribus arcuatis, anguste marginatis; angulis anticis rotundatis, posticis obtusis; margine antico arcuato, postico truncato; basi utrinque prope angulos posticos foveolata; elytris subparallelis, ad apicem conjunctim rotundatis, prothorace vix latioribus; anguste marginatis, punctato-striatis; stria scutellari brevi; intervallis planis. Long., 5 mill.

Allongé oblong, convexe, couvert d'une pubescence grise couchée, plus dense sur les elytres, roux ferrugineuse, un peu enfumé varié de petites taches noires sur les elytres. Antennes et pattes plus claires. Tête transversale; yeux gros, assez saillants, marge antérieure tronquée, ponctuation serrée. Articles 1 à 5 des antennes plus longs que larges; 6 à 8 moniliformes, 9 à 11

* Ericmodes, Reit., Zool. Bot. Gesell, Wien, 1877, p. 167.

formant une massue bien marquée. Prothorax environ deux fois aussi large que long, rétréci à la base et au sommet ; marges latérales regulièrement arqués etroitement rebordées ; marge antérieure arquée, postérieure tronquée ; angles antérieurs arrondis, postérieure obtus ; ponctuation dense, semblable à celle de la tête ; une impression de chaque côté, le long de la base, prés des angles postérieurs. Ecusson transversal, densement pubescent. Elytres un peu plus larges que le prothorax, en ovale tres allongé, arrondis ensemble au sommet, 2 fois $\frac{1}{2}$ aussi longs que larges, ponctués striés ; stries bien marquées jusqu' au sommet ; intervallés plans ; un rudiment de strie à côté de l'ecusson. Profil des elytres légèrement concave vers le sommet.

S. Australia. Trouvé dans les fentes de l'ecorce du *Santalum acuminatum*.

CRYPTARCHA DEPRESSA, *n. sp.*

Ovata, depressa, sat nitida, pubescens, nigro-picea ; margine antico capitis, lateribus prothoracis et elytrorum, lata plaga humerale et pygidio rufo-ferrugineis ; antennis pedibusque rufo-testaceis ; capite prothoraceque sat dense punctatis, epistomo bi-impresso ; prothorace transverso, antice angustato, lateribus arcuatis, margine antico subtruncato, postico subemarginato ; disco in longitudinem levi et obtuse subcarinato ; elytris ovatis, ad apicem truncatis, punctato-striatis ; intervallo secundo, basin versus latiore et elevato. Long., 1 mill. $\frac{1}{2}$ à 2 mill. $\frac{1}{2}$.

Ovale, déprimé, assez brillant, couvert d'une pubescence flave, couchée, assez dense, disposée en lignes sur les elytres, brun de poix ; marge antérieure de la tête, bord latéraux du prothorax et des elytres une large tache humerale et pygidium roux-ferrugineuse ; antennes et pattes un peu plus claires. Antennes gréles, massue bien marquée. Tête et prothorax assez densement ponctués ; epistome bi-impressionnés, mandibules bi-dentées à l'extrémité. Prothorax tres transversal, pars plus large que la tête en avant, prèsentant sa plus grande largeur à la base ; bord antérieur presque droit, légèrement sinué de chaque côté, bords latéraux régulierement arqués, sensiblement elevés, base subèchancrée, rebordée ; sur le milieu du disque un espace longitudinal lisse, faiblement relevé en carène obtuse. Ecusson demi-circulaire. Elytres deux fois plus longs que le prothorax aussi larges à la base, subparallels les $\frac{2}{3}$ de leur longueur puis progressivement rétrécis, tronqués au sommet, laissant à découvert le dernier segment de l'abdomen, ponctués striés ; stries bien marquées jusqu' au sommet ; 2me intervalle à partir de la sutura plus large et légèrement relevé dans la partie basilaire. Pattes comprimées. Mesosternum non caché, longitudinalement bi-

sillonné. Metasternum avec un large impression longitudinale, peu profonde.

S. Australia. Sous les écorces des Eucalyptus.

La tache humérale ne paraît pas constante chez cette espèce. Nous n'avons pas cru nécessaire de créer un genre nouveau pour cette nouvelle forme de Cryptarcha qui se trouve très nettement caractérisée par son corps presque complètement déprimé.

COLYDIIDÆ.

Todima, *n.g.*

Caput basi constrictum, haud deflectum; oculis magnis, productis; antennis prope oculos et submargine frontis insertis, 11-articulatis, clava bi-articulata, sulcis antennarum nullis; caris coxarum anticarum conclusis; processu prosterni coxas superante; segmentis abdominis 1—2 reliquis longioribus; tibiis ad apicem spinosis, tarsis sat elongatis, 1° articulo longiore, 3° brevissimo.

Ce genre ne fait parti d'aucune des sous groupes indiqués par Lacordaire : il vient se placer entre les Synenitodes proprement dits et les *Acropis*, *Lemnis*, &c.

Todima fusca, *n. sp.*

Elongato-oblongato, leviter convexa, pubescens, fusca, antennis pedibusque dilutioribus; capite prothoraceque subopacis, fronte depressa; prothorace transverso, angulis anticis rotundatis, posticis obtusis, apice et lateribus arcuatis, basi in medio truncata, utrinque late emarginata; disco depresso, juxta basin bipunctato; scutello transverso; elytris oblongis, basin versus prothorace vix latioribus, apice obtuse acuminatis, punctato-striatis, intervallis 3 et 6 latioribus. Long., $3\frac{1}{2}$ mill.

Ovale très allongé, faiblement convexe, brun-noir; pattes et antennes plus claires. Tête transversale, un peu rétréci en avant, opaque, couverte d'une pubescence grise, couchée assez dense; yeux presque contre les angles postérieurs, front déprimé, limité en arrière par une brusque depression. Prothorax tres peu brillant, transversal, plus large que la tête y compris les yeux, arrondi latéralement, présentant sa plus grande largeur en avant du milieu; angles antérieurs largement arrondis, postérieurs obtus; bord antérieur arqué en avant, postérieur tronqué dans le milieu, largement sinué de chaque côté; disque déprimé, marge antérieure légèrement relevé dans le milieu, marge postérieure avec un point enfoncé, de chaque côté, au niveau du commencment du sinus latéral; pubescence couchée, assez dense surtout sur les côtés, orientée dans des directions convergentes vers la ligne médiane

du prothorax. Ecusson transversal, arrondi au sommet. Elytres brillantes, ovales, plus de trois fois plus longs que larges, un peu plus larges à la base que le prothorax, obtusement acuminés ensemble au sommet ; ponctués striés ; stries fines ; intervalles trois et six plus larges ; strie scutellaire assez courte ; pubescence couchée, plus fine que celle de la tête et du prothorax, disposée en lignes. Dessous brun, brillant.

King George's Sound, West Australia.

Todima rufula, *n. sp.*

Elongata, fere parallela, vix convexa parce pubescens, rufulâ ; capite, disco prothoracis, et lateribus elytrorum ad apicem nigris ; capite quadrato, antice bifoveolato ; prothorace transverso, angulis anticis acutis, posticis obtusis ; apice emarginato, in medio subproducto ; lateribus rotundatis, basi arcuata ; disco depresso, utrinque substriato, striis juxta basin incurvatis et conjunctis ; scutello transverso ; elytris oblongis, prothorace vix latioribus, ad apicem conjunctim rotundatis, punctato-lineatis, intervallis alternis subelvatis ; tibiis, articulis 1—2 tarsorum fuscis. Long., 3½ mill.

Allongé, oblong, très faiblement convexe, presque glabre, roux ; tête-disque du prothorax et marges des elytres vers le sommet noirs. Tête carrée, presque mate, très finement ruguleuse sur les côtes, impressionnée en avant de chaque côté vers la base des antennes. Prothorax près opaque, à peine ponctué, de moitié plus large que long, notablement plus large que la tête, aussi large à la base, qu'au sommet ; bord antérieur échancré, un peu saillant vers la tête dans son milieu ; bords latéraux arqués, présentant leur maximum d'écartement en avant du milieu, base arquée, très légèrement sinuée vers les angles postérieurs ; angles antérieurs aigus, emoussés, postérieurs obtus emoussés ; disque deprimé ; marge antérieure faiblement relevée de chaque côté près du milieu en lobes s'arretant latéralement à une strie longitudinale très faiblement marquée sur le disque, profondement imprimée vers la base qu'elle reborde en s'infléchissant vers l'écusson. Ecusson transversal, oblong. Elytres à peine brillantes, ovales très allongés, un peu plus larges à la base que le prothorax, arrondis ensemble au sommet, présentant leur plus grande largeur vers le tiers postérieur, présentant de chaque côté vers la marge latérale un pli assez marque, ponctués striés ; intervalles alternes légèrement relevés ; strie scutellaire courte. Pattes sauf les articles 2 et 3 des tarses enfumés.

West Australia.

Sympanotus australis, *n. sp.*

Oblonglus, subparallelus, subconvexus, piceus, setulosus ; capit˘

antice bifoveolato; prothorace transversim subquadrato, antice angustato; margine antice bisinuato, lateribus arcuatis, basi utrinque late emarginata; angulis anticis et posticis rectis : disco inæquali, in longitudinem sulcato, setis piceis et flavescentibus vestito; scutello transverso; elytris parallelis, ad apicem conjunctim subacuminatis, punctato striatis, piceo-setosis, fasciculis flavescentibus et cinereis sparsis; antennis pedibusque rufo-testaceis. Long., 4 mill.

Oblong, suparallele, faiblement convexe, noir de poix, garni de soies dressées, courtes. Tête transversale, arrondie en avant, impressionnée obliquement de chaque côté vers la base des antennes. Prothorax beaucoup plus large que la tête, une fois et un tiers aussi large que long, rétréci en avant; bord antérieur saillant sur la tête, sinué de chaque côté; bords latéraux paralleles dans la partie basilaire, arqués convergents dans la partie apicale; base arquée dans le milieu, largement échancrée de chaque côté; marge antérieure etroitement relevée en bourrelet; marges latérales faiblement explanées, ciliées, marge basilaire profondement rebordée sur les côtés; disque irregulier, revetu de soies variant du clair au brun masquant la structure du tegument sauf sur une ligne longitudinale mediane qui presente l'aspect d'un sillon. Ecusson très transversal, peu visible. Elytres deux fois et demie aussi longe que le prothorax, subparalleles, subacumines ensemble au sommet, ponctués striés; intervalles, subconvexes garnis d'une rangée de soies dressées; une bande suturale peu marquée, deux taches dans la région basilaire et deux bandes transversales très diffuses, la 1me vers le milieu, la 2me avant le sommet formées de touffes de poils gris ou déterminées par des soies plus claires. Pattes et antennes roux testacees.

Montagnes de Victoria.

New Australian Lepidoptera.

By Oswald B. Lower, F.E.S.

[Read May 2, 1893.]

Rhopalocera.

SATYRIDÆ.

Heteronympha paradelpha, *n. sp.*

Male and female, 54-64 mm. Head, thorax, and abdomen yellowish-brown. Palpi whitish, clothed with blackish hairs beneath, especially towards apex. Antennæ fuscous, annulated with white. Legs whitish-ochreous. Anterior tibiæ fuscous. Forewings triangular, costa gently arched, more strongly in male; hindmargin rounded, oblique, more so in male; dark-fuscous, with twelve orange spots, arranged as follows:—First, costal, elongate from base to about middle, leaving extreme costal edge fuscous; second, sphenoid, immediately above inner margin, from base to near middle, suffused with ground-colour in middle, more so in male; third, just beyond second, semiovate (irregular), touching second on lower half; fourth, just beyond third, above anal angle, irregular diamond-shaped, in male anteriorly indented in middle; fifth, immediately beneath posterior angle of first, irregular-sphenoid, contracted in middle, in male upper portion very narrow, almost, if not quite, separated by ground-colour; seventh, near apex, irregular-ovate, posteriorly obtuse; sixth, irregular diamond-shaped, midway between fifth and seventh; eighth, ninth, tenth, and eleventh form a hindmarginal band; ninth and eleventh, very small, latter obsolete in male; tenth, spherical, a black ocellus, with a minute white eye just below seventh; twelfth rounded (paler than others), below ocellus; cilia ochreous-fuscous. Hindwings with hindmargin rounded, waved; orange-yellow, markings fuscous; a curved band from middle of costa to middle of disc (in male suffusedly continued to inner margin), strongly attenuated towards costa; a transverse spot at about end of cell; two waved hindmarginal bands, confluent at apex, attenuated to anal angle, and touching curved band in centre; in male the two bands are confluent throughout, leaving four irregular spots of ground-colour. A black ocellus with minute white eye above anal angle; two minute black dots in neural spaces at apex of hindmarginal bands; a blackish line along hindmargin, surmounted by a strip of ground-colour of same width. Cilia as in forewings.

Underside.—Forewings orange-yellow, lighter towards base, markings dark-fuscous; a small spot in middle of cell, obsolete in female; a spot within and near end of cell, larger in female; a moderate band, from middle of costa to two-thirds above inner margin, angulated outwards in middle; a lunate mark beneath, in female meeting band; another band from costa near apex to near anal angle, very broad, and much paler on costa, contracted below middle, anal portion touching posterior extremity of lunate mark; a narrow hindmarginal band; a black ocellus ringed with yellow, with a minute white eye; a round yellowish spot immediately beneath. Hindwings yellowish-brown, mixed with bluish-grey; three strongly-waved dark-brown lines from costa at one-third, one-half, and five-sixths respectively, to inner margin at one-third, one-half, and anal angle; a series of three black ocelli, edged with yellow, and ringed with brown, one above anal angle (largest), two near apex, lower the smallest; two minute white spots between first and second ocelli, a double dark-brown hindmarginal line.

Between *Banksii* and *Philerope*, but quite distinct from either. Melbourne, Victoria, from Mr. F. Spry.

Heterocera.

Bombycina.

COSSIDÆ.

Cossus rhytiphorus, *n. sp.*

Male, 66-70 mm. Head, palpi, antennæ, thorax, and abdomen dark slaty-grey, palpi porrected, twice the length of eye. Antennal pectinations four. Thorax with a narrow black anterior band and two longitudinal stripes, one on each shoulder. Legs dark slaty-grey, tarsi obscurely ringed with whitish. Forewings moderate, costa evenly arched; hindmargin rounded, oblique, dark slaty-grey, with numerous black transverse strigulæ, edged with whitish or ochreous, having the appearance of raised cracked lines; five irregular, short, black streaks on costa, between base and middle, irregularly and interruptedly to or near inner margin; an irregular V-shaped black mark from costa near middle obscurely continued to inner margin near middle; five or six similar, but much more obscure, marks on costa from beyond middle to apex, leaving middle of costa with a clear space of ground-colour, except a minute dot; black markings more distinct towards anal angle, where they form four or more irregular transverse streaks; a narrow black streak from base to anal angle, cutting last-mentioned streaks more distinct posteriorly; cilia ashy-grey-whitish, darker basally. Hindwings with hindmargin rounded, slightly sinuate towards anal angle, which becomes

slightly prominent, grey-whitish, base densely haired with ashy-grey, cilia as in forewings. Underside of hindwings slightly paler than above, with well-marked fuscous reticulations, base of cilia with an ill-defined fine ochreous line.

One specimen Slape's Gully, November 9, 1892 ; another at Blackwood, South Australia, October 21, 1892 ; also from Melbourne, Victoria (Coll. Kershaw) ; and one in S.A. Museum, in poor condition. Reminds one of *Ptilomacra senex*, Walk.

Cossus (?) polygrapha, *n. sp.*

Female, 28-35 mm. Head and palpi light-fuscous, mixed with whitish and black, antennæ dark-fuscous, slenderly annulated with white, base ochreous, thorax ashy-grey-whitish, patagia with well-defined black edge. A similar band on posterior portion of thorax, divided in middle by a whitish spot. Abdomen with two basal segments ochreous grey, third somewhat rufous, rest fuscous grey, margins whitish, crests whitish. Legs light-fuscous, posterior pair darker, ringed with whitish at apex of joints. Forewings elongate oblong, costa arched at base, hindmargin almost straight, slightly oblique, light-fuscous, irrorated with round patches of white and black scales. Veins before middle outlined in blackish, a white suffusion from middle of base to before middle of wing, posteriorly bent down along vein 1 to two-thirds, thence continued suffusedly (in one specimen very indistinctly) to costa about two-thirds, suffused at anal angle ; twelve or fifteen blackish spots along costa, from each of which proceeds an interrupted blackish waved line towards inner margin ; more distinct in middle of disc, where there are some ferruginous scales suffused ; a small white spot on submedian fold, a fan-shaped patch from costa before apex to vein 1, where it is edged by a black line, and on costa with three elongate black marks. In the patch the veins are thickly outlined with white, and a few black scales at base ; cilia light-fuscous, sprinkled with blackish, at extremities of veins with elongate white streaks, continued to tips, giving the appearance of black and white lines. Hindwings fuscous at base, with ochreous hairs Cilia whitish, base ochreous tinged.

Mitcham and Parkside in May, two female specimens. Without the male it is uncertain as to genus ; perhaps a new one will be required to receive it. It hardly seems a *Cossus*, as generally understood.

ARCTIADÆ.

Termessa Lyelliana, *n. sp.*

Male and female, 26-28 mm. Head, face, and thorax, snow-white ; thorax with a broad dark-fuscous transverse median band, shoulders broadly black. Palpi and antennæ blackish. Anterior

legs dark-fuscous, middle and posterior pair ochreous-yellowish. Abdomen ochreous-yellow, anal segments beneath blackish. Forewings elongate triangular; costa gently arched, hindmargin obliquely rounded, white; markings blackish, inner margin ochreous-yellow throughout, a thick elongate streak along costa from very near base to beyond middle, posteriorly dilated; a straight slightly dentate line from basal extremity of this streak to inner margin, but not quite reaching it; a similar, but thicker line from two-thirds of costal streak to inner margin before middle, strongly curved outwards in middle; a third similar line from about four-fifths of costa to inner margin at four-fifths, strongly curved outwards in the middle; a well-defined black discal dot midway between second and third lines; costal edge above discal dot ochreous-yellow; a tolerably broad suffused hindmarginal band, from apex to anal angle, leaving an irregular rounded spot of ground-colour above middle of hindmargin; cilia blackish, with about six ochreous-white teeth at extremities of veins. Hindwings ochreous-yellow, with a blackish apical patch, continued midway along hindmargin, strongly attenuated posteriorly. Cilia ochreous-yellow, suffused with blackish at apex.

Two specimens received from Mr. G. Lyell, jun., who states that it frequents *Exocarpus cupressiformis* ("Wild Cherry-tree") in February and March, at Gisborne, Victoria. A distinct and neat species, not closely allied to any other, but approaching *T. nivosa*, Walk., by the white forewings, but immediately separable by the yellow hindwings. At first sight it is not unlike a large *Comarchis* or *Thallarcha*.

Sorocostia anisogona, *n. sp.*

Male, 26 mm. Head, thorax, antennæ, and palpi fuscous, minutely irrorated with whitish; palpi two and a half; thorax with a narrow anterior blackish band, indications of another in centre, transverse, and two black spots posteriorly. Legs and abdomen grey-whitish, anterior tibiæ and tarsi blackish; tarsi with obscure whitish rings. Forewings elongate triangular, costa gently arched, hindmargin obliquely rounded; dark-fuscous, minutely irrorated with whitish iridescent scales; tufts blackish anteriorly, posteriorly whitish; first tuft connected with costa by a few black scales; a well-marked dentate blackish line from one-fourth costa to one-fourth inner margin, strongly curved, and touching second tuft in middle, margined anteriorly with whitish near inner margin; a second similar line from about two-thirds costa to beyond middle of inner margin, strongly curved outwards above middle. Concavity beneath occupied by a patch of whitish scales; a rather thick, well-defined black streak from below middle of second line to first line, but not quite reaching it.

Some black scales connected with this on inner margin, and enclosing a small spot of ground-colour; a third line from before apex to anal angle, upper half indistinct, lower half posteriorly edged with whitish, with a rounded projection in middle; a hind-marginal row of elongate black dots; cilia dark-fuscous, with white teeth at extremities of veins. Hindwings and cilia fuscous, cilia with a lighter basal line.

One specimen from Blackwood, in November. The large size and well-marked lines are good characteristics.

LIPARIDÆ.

Euproctis pelodes, *n. sp.*

Male, — mm. Head, palpi, antennæ, thorax, legs, and abdomen brownish-ochreous. Antennal pectinations six. Forewings elongate triangular, costa slightly arched near base, apex rounded, hindmargin oblique, brownish-ochreous. A row of tolerably well-defined whitish spots from near anal angle to near apex, slightly angulated outwards in middle, the first spot more elongate; cilia whitish-ochreous, barred with dark-brownish-ochreous. Hindwings and cilia as in forewings, but without markings.

One specimen, Parkside (at light), in January.

Darala hæmoptera, *n. sp.*

Male, 52 mm. Head, palpi, thorax, legs, and abdomen mahogany-red. Anterior tarsi ochreous-reddish. Antennæ ochreous-yellow; pectinations eight, fuscous. Forewings triangular, costa straight, hindmargin bowed, oblique; mahogany-red, with purple-fuscous markings; an ill-defined curved band from one-third costa to one-third inner margin, anterior edge well-defined, posterior suffused; a well-defined white discal dot ringed with black; a broad, nearly straight, waved band; anterior edge from two-thirds costa to three-fifths inner margin, irregular; posterior edge from five-sixths costa to near anal angle, indented on veins, each indentation being filled up with a black dot; a moderate hindmarginal line, space anteriorly paler than rest of wing; cilia reddish-ochreous. Hindwings with hindmargin rounded, reddish-fuscous, lighter towards base; a black discal dot; a row of black dots on veins, nearly straight, from costa near apex to anal angle, edged posteriorly with a lighter band; a suffused fuscous hindmarginal band; cilia as in forewings.

Port Lincoln; one specimen (Rev. T. Blackburn).

BOMBYCIDÆ.

Bombyx zonospila, *n. sp.*

Male, 40 mm. Head, thorax, palpi, and legs pale dove-colour;

face blackish, terminal joint of palpi whitish. Abdomen blackish-fuscous. Antennæ whitish; pectinations twelve, orange. Forewings triangular, costa straight, hindmargin bowed, oblique, slightly waved; pale dove-colour; a row of irregular black dots, edged *posteriorly* with orange, from near middle of costa to about one-third inner margin; a similar row on veins from two-thirds costa to two-thirds inner margin, edged *anteriorly* with orange; cilia pale dove-colour, with a darker hindmarginal line. Hindwings slightly darker than forewings. Cilia as in forewings, with a whitish parting line at base.

Eucla; one specimen, in June.

Bombyx galactodes, *n. sp.*

Female, 58-60 mm. Head, thorax, and abdomen fuscous; lower part of face ochreous. Abdominal segments paler, thorax mixed with whitish. Antennæ fuscous; pectinations four, orange. Legs dark-fuscous, tarsi obscurely ringed with whitish. Forewings elongate triangular, costa straight, arched towards apex; hindmargin slightly waved oblique; fuscous, irrorated with white, with darker fuscous markings; three moderate bands, first from one-fourth costa to one-fourth inner margin, slightly curved outwards; second from middle of costa to three-fifths inner margin, with a projection outwards above middle, angulated inwards below middle, a white discal dot edged with dark-fuscous midway between the two lines; third line from four-fifths costa to anal angle, sharply indented inwards beneath costa, thence outwards, and continued strongly dentate to anal angle; space between second and third lines *milky-white*, marked only by brown veins; a suffused milky-white patch reaching costa near apex, and continued along posterior edge of third line; cilia fuscous, tips whitish. Hindwings milky-white, base densely clothed with brownish hairs; cilia as in forewings.

Duaringa, Queensland, two specimens, from Mr. G. Barnard, who informs me that they are attached to *Casuarina*, and form hard woody cocoons on the outside of the bark. In these respects they agree exactly with *vitulina*, Don, and *mioleuca*, Meyr., the present species being intermediate. In Meyrick's original description of *mioleuca* (Tr. Roy. Soc. S.A., XIV., p. 190, 1891) it is stated that the specimens were taken at "Mount Lofty by Mr. E. Guest, who has taken others." This is erroneous, as Guest never saw the insects until I gave him a pair. They are very local, and can *only* be obtained by breeding. Even then they are difficult to get in good condition, as they usually emerge (60 per cent.) between midnight and six o'clock in the morning. Parkside and Knightsbridge are the only places I have found them.

Noctuina.

APAMIDÆ.

DASYGASTER MUNDOIDES, *n. sp.*

Male and female, 38-42 mm. Head, palpi, and thorax fuscous-reddish, sprinkled with ashy-whitish. Antennæ whitish, annulated with black; base snow-white. Ciliation one. Abdomen greyish-ochreous, anal-tuft reddish. Legs dark-fuscous, mixed with reddish and clothed with long whitish hairs; tibiæ and tarsi fuscous-reddish, with suffused whitish apical rings. Forewings moderate, posteriorly dilated, costa gently arched, hindmargin nearly straight, oblique; brownish, minutely and closely irrorated with black and white scales; veins outlined with reddish towards hindmargin, in middle somewhat with blackish, a strongly angulated reddish-fuscous indistinct line from costa at one-fourth to inner margin at one-third, a paler ovate spot lying longitudinally in disc above middle at one-third; an irregular 8-shaped spot immediately beyond, not indented anteriorly; an irregular outward-curved dentate line from about two-thirds of costa to two-thirds innermargin, with a projection inwards below middle to beneath middle of 8-shaped spot; a row of suffused black hindmarginal spots; cilia coppery-fuscous, with two waved fuscous lines. Hindwings iridescent-whitish, a suffused blackish hindmarginal band broadest at apex, and gradually narrowing to a point towards anal angle; cilia snow-white, with a few black scales at apex (variable). In the female the markings of forewings are almost obliterated in the general ground-colour, and the hindwings almost wholly suffused with fuscous.

Blackwood, Parkside, South Australia; and Melbourne, Victoria. At first sight very like *Agrotis munda*, Walk., but the antennæ afford a distinguishing test.

NOCTUIDÆ.

ORTHOSIA CREMNODES, *n. sp.*

Male and female, 35-38 mm. Head blackish, minutely irrorated with grey; palpi fuscous, mixed with black and white, internally paler. Antennæ rufous beneath, fuscous above. Thorax blackish, with a distinct narrow whitish anterior band, cleft in middle. Abdomen whitish-fuscous. Legs reddish-fuscous, tibiæ and tarsi with indistinct white bands. Forewings moderate; costa straight, hindmargin somewhat waved, rounded; blackish or black, minutely irrorated with grey; veins indistinctly outlined in black; a yellow dot in disc at end of cell; a transverse row of black dots beyond; a narrow pale-fuscous hindmarginal line; cilia dark-fuscous, basal-half black. Hindwings iridescent-whitish; a suffused blackish apical patch, abruptly

narrowed and continued interruptedly to anal angle, more prominent at extremities of veins; a narrow blackish hindmarginal line; cilia shining white, with a coppery tinge at apex, and a suffused fuscous dividing line. Underside of forewings fuscous; a suffused white streak along costa from base to five sixths; a tuft of yellow hairs near base. Hindwings iridescent-whitish, costa sprinkled with blackish, an irregular roundish blackish patch at apex; a transverse discal spot, scarcely perceptible above.

Parkside, S.A., in October (at light).

ORTHOSIA MESOMBRA, *n. sp.*

Male and female, 31-35 mm. Head, thorax, and palpi greyish-ochreous, palpi whitish beneath, with a blackish median band, terminal joint whitish. Thorax with a narrow blackish band beyond middle. Antennæ greyish-ochreous, reddish beneath. Ciliations one-half. Abdomen and legs grey-whitish, spotted with blackish, tarsi and tibiæ with obscure whitish rings. Forewings moderate, posteriorly dilated; costa nearly straight, hindmargin rounded, oblique; greyish-ochreous in male, in female wholly suffused with fuscous; an orange-red spot close to base; a short irregular blackish line from costa to this spot; an indistinct angulated fuscous line from one-fourth costa to near middle of inner margin; a wedge-shaped dark fuscous streak in middle of disc, from two-fifths to five-sixths, dilated and touching costa, terminated by an irregular line from costa at five-sixths; a small round reddish spot at beginning, and larger somewhat lunate spot in middle of the wedge-shaped streak; a fuscous dentate line from costa immediately above lunate spot, and passing round it to three-fourths inner margin, between this line and termination of wedge-shaped spot, the wing is reddish-tinged in male; an interrupted waved hindmarginal line; cilia-greyish ochreous. Hindwings iridescent whitish, in female suffused with fuscous at apex and along hindmargin; an indistinct curved series of elongate marks, placed on veins, in middle of wing; an obscure fuscous discal spot, both markings more noticeable on underside.

A pretty species, not recalling any other; the sexes are somewhat dissimilar, but it cannot be well mistaken.

Parkside (at light) in October; also from Blackwood, S.A.

PSEUDOPANTHERA HABROCOSMA, *n. sp.*

Male, 35-38 mm. Head blackish-fuscous, palpi and antennæ reddish-fuscous, anterior legs dark-fuscous, posterior and middle pairs whitish-ocherous, thorax reddish-fuscous, abdomen orange. Forewings elongate, costa strongly arched at base, apex acute, hindmargin sinuate beneath apex, thence strongly bowed, oblique; fuscous-reddish, irrorated with ochreous and lead-coloured scales,

veins marked with darker posteriorly; a short thick streak from one-sixth costa outwardly oblique to middle of wing, edged anteriorly by a more or less whitish suffusion, posteriorly by a broad patch of whitish-yellow, in one specimen suffused with brown, an elongate patch of lead-coloured scales in middle of wing, just beyond, sometimes obscurely continued towards hindmargin; an obscure irregular lead-coloured thick streak from beneath apex to anal angle, obscurely edged with whitish; an obscure oblique white apical dash, sharply margined posteriorly with dark-brown; an interrupted black hindmarginal line, preceded by a whitish irroration; cilia greyish-fuscous, with a darker median line. Hindwings with hindmargin somewhat prominent in middle, slightly sinuate above and below, bright-orange; an elongate black apical patch; cilia yellow.

A beautiful species, bearing a superficial resemblance to some forms of *Selidosemidæ*. Two specimens beaten from *Hakea rugosa*, at Blackwood, February to April. It is an exceedingly difficult species to net, and hiding as it does amongst the sharp spiny branches of the above-mentioned plant usually escapes through the net getting entangled.

Geometrina.

MONOCTENIADÆ.

Taxeotis gonosemela, *n. sp.*

Male, 28 mm. Head, palpi, antennæ, thorax, abdomen, and legs greyish-ochreous; anterior legs infuscated. Forewings triangular, hindmargin obliquely rounded; greyish-ochreous, minutely irrorated with black scales; costa strigulated throughout with blackish; an indistinct blackish angulated line from about one-third costa to below middle of disc, thence strongly oblique to one-sixth inner margin; a more distinct similar line from immediately before apex to about two-thirds inner margin, strongly angulated inwards above and below middle; a small black discal dot in middle of wing; a hindmarginal row of black dots; cilia ochreous-grey. Hindwings whitish, speckled with blackish; an obscure black discal dot; a very obscure row of minute black dots, from two-thirds costa to two-thirds inner margin (both plainly visible on underside); a blackish hindmarginal line interrupted on veins; cilia as in forewings.

One specimen, Parkside, at a street lamp.

Darantasia pachygramma, *n. sp.*

Male, 18 mm. Head whitish, thorax, abdomen, legs, and palpi pale stone-colour. Antennæ yellowish-tinged. Forewings triangular, short; stone-colour, minutely and sparsely irrorated

with black; costa blackish towards base; a very thick black streak from near base of inner margin to beyond middle of disc curved upwards and attenuated at both extremities, posteriorly edged with paler; a similar black streak from apex to anal angle, attenuated at apex, edged as other; a hindmarginal row of small black dots. Hindwings with colour as in forewings; a very indistinct line from two-thirds inner margin going towards costa, but not reaching it.

Eucla, West Australia. One specimen in June. An abnormal-looking species, more like a small *Dichromodes* in appearance.

NEARCHA PSEUDOPHAES, *n. sp.*

Male, 32 mm. Head, thorax, legs, and abdomen greyish-ochreous; palpi two and a-half, black, at base white. Antennæ whitish, pectinations twelve. Forewings elongate; costa arched at base, slightly sinuate beyond middle, hindmargin nearly straight, slightly oblique; ochreous-grey, with scattered fine dark-fuscous scales; a transverse straight row of three black dots, from one-third costa to above middle of wing, edged anteriorly with a whitish-ochreous streak; a row of black dots from costa at three-fourths to inner margin at two-thirds, angulated inwards below middle; each spot is edged posteriorly with whitish, and beyond this a pale reddish-ochreous suffusion throughout; a large black discal dot, white centred, midway between the two rows of dots; a row of black dots at extremities of veins; cilia ochreous-grey. Hindwings with hindmargin nearly straight; whitish-grey, fuscous-tinged; an indistinct dark-fuscous discal dot; a hindmarginal row of black dots; cilia as in forewings. Hindwings beneath without tufts, but with a well-defined black discal dot.

Near *D. curtaria*, Gn., but differs in black shorter palpi, &c. Two specimens at Blackwood, S.A.

DICHROMODES STROPHIODES, *n. sp.*

Male and female, 22-25 mm. Head and thorax dark ashy-grey, thorax with a tranverse black median band; palpi three and a-quarter, black. Antennæ, abdomen, and legs dark fuscous. Abdomen with yellowish segmental margins, tibiæ ringed with white, antennal ciliations three and a-half. Forewings triangular; costa straight, arched at base; hindmargin slightly waved, bowed, oblique; ashy-grey; a suffused blackish triangular spot midway between base and first line; first line straight from one-fourth costa to one-fourth inner margin, suffusedly edged on each side with pale-ochreous; second line straight from costa one-third to inner margin before middle; third line from two-thirds costa to two-thirds inner margin, with a strong projection outwards in middle,

sinuate above and below, more strongly below; space between second and third lines blackish, with a blacker transverse discal dot, a narrow line near and parallel to third, on projection suffused with ochreous; a broad blackish undulating line from costa near apex to anal angle, edged posteriorly throughout with whitish, a suffused whitish apical dash; a waved black hindmarginal line; cilia fuscous, barred with whitish-fuscous, basal-half dark fuscous, base sprinkled with white. Hindwings with hindmargin waved, rounded; slaty fuscous; three short, whitish, dark margined streaks on inner margin above anal angle, upper one continued suffusedly across wing to costa at two-thirds, an indistinct blackish discal dot; cilia light-fuscous, with a darker median line, base whitish.

Very near *D. triparata*, Walk., but a stouter built insect, broader winged, hindmargin more bowed, &c. The descriptions of this species and "*triparata*" read somewhat alike, but the difference in the insects when compared is well marked. Blackwood and Highbury, S.A., not uncommon in November. Mr. Meyrick has specimens from the "Grampians," Victoria.

GEOMETRIDÆ.

Iodis rhytiphorus, *n. sp.*

Female, 36 mm. Head, fillet, palpi, antennæ, thorax, and abdomen whitish-ochreous. Palpi rather short, terminal portion of antennæ reddish-fuscous, patagia broadly green. Abdomen above sprinkled with green near base. Legs pale reddish-fuscous, coxæ white. Forewings elongate triangular; costa nearly straight, rounded towards apex.; hindmargin nearly straight, slightly rounded, 3 and 4 from a point; light bluish-green, with numerous minute transverse whitish strigula; costa whitish-ochreous throughout, more broadly in middle; lines white narrow straight, tolerably well-defined, first from beneath costa at one-sixth to inner margin at one-fourth, second from beyond middle of costa to two-thirds of inner margin, a transverse darker green discal dot. Cilia pale whitish-ochreous, tips fuscous. Hindwings with hindmargin somewhat rounded obtusely-bent on vein 4, three- and four-stalked, colour and cilia as in forewings, lines as in forewings running continuously with them, but second more irregular and scalloped twice between veins 1 and 3, first line irregular and bent inwards from vein 3 to near inner margin.

Palmerston, Northern Territory, one specimen. Nearest to *I. albicosta*, Walk., but differs markedly in position and shape of lines, otherwise superficially similar.

Acidalia didymosema, *n. sp.*

Male, 23 mm. Head, palpi, thorax, and abdomen dark-fuscous. Antennæ whitish; ciliations two. Legs fuscous

posterior pair whitish. Forewings elongate triangular, costa very slightly arched; hindmargin obliquely rounded; light fuscous-ochreous-tinged; a well-developed nearly straight denticulate dark-fuscous line from beyond one-third of costa to middle of inner margin; a similar line, more oblique, from costa beyond two-thirds to inner margin at two-thirds curved inwards on lower half, a well-developed transverse discal spot midway between these two lines, a blackish hindmarginal line, somewhat interrupted by veins. Cilia dark-fuscous. Hindwings with hindmargin rounded; colour, lines, and cilia as in forewings.

The present species could easily be mistaken for *rubraria*, Dbld., to which it bears a close superficial resemblance, but differs considerably in position of lines and discal dot, and especially by the shorter antennal ciliations. One specimen at Glen Osmond, 10th October.

Sterrha aglaodesma, *n. sp.*

Male, — mm. Head, palpi, antennæ, thorax, and legs whitish-ochreous. Abdomen whitish. Forewings triangular, costa arched at base; hindmargin nearly straight, oblique; pale-ochreous; a straight fuscous line from one-fourth costa to one-third inner margin; a similar, but broader, line immediately beyond; a dark-fuscous waved line from two-thirds costa to two-thirds inner margin, with a moderate indentation above middle; space between last two lines filled with white; a narrow dentate, fuscous line from before apex to anal angle, edged anteriorly with a darker fuscous suffusion, posteriorly by a fine *distinct* white line; a hindmarginal row of obscure white dots, veins towards hindmargin obscurely outlined with white; cilia ochreous, with white streaks at termination of veins. Hindwings whitish; an indistinct suffused fuscous line from anal angle to near apex: cilia white.

Eucla, Western Australia; one specimen, in June. This genus has not previously been recorded in Australia.

Pseudoterpna argyraspis, *n. sp.*

Male, 36 mm. Head, thorax, and palpi whitish; posterior portion of thorax with two longitudinal black streaks meeting anteriorly; abdomen fuscous, with blackish tufts; legs whitish, ringed with black. Forewings elongate triangular, hindmargin rounded, slightly waved, oblique; silver-grey; all veins tending to be outlined with black; a suffused triangular patch on middle of costa, costal edge from patch to base broadly and suffusedly irrorated with blackish; a sharply-defined black streak from base of wing along fold to about middle; an indistinct row of elongate streaks between veins from four-fifths costa to anal angle; a black hindmarginal line; cilia whitish, barred with

fuscous. Hindwings with hindmargin rounded, slightly waved, whitish, becoming white towards inner margin and base; a broad suffused blackish hindmarginal band, a blackish hindmarginal line; cilia as in forewings.

One specimen, bred in February from *Eucalyptus rostrata;* forms a rough silky cocoon beneath the bark; Blackwood, S.A.

SELIDOSEMIDÆ.

Diastictis goniota, *n. sp.*

Female, 28 mm. Head, palpi, antennæ, and thorax ochreous-fuscous, antennæ spotted with black. Abdomen and legs greyish, minutely irrorated with dark fuscous. Forewings elongate, costa strongly arched near base; hindmargin strongly angulated in middle, sinuate above and less below this angulation; light ochreous-fuscous; a black dot in disc about middle; a dark-fuscous line from costa at five-sixths to four-fifths inner margin, slightly angulated near costa, and margined rather broadly on each side with darker ground-colour; a hindmarginal row of indistinct black dots; cilia ochreous-fuscous, with a whitish basal line. Hindwings with hindmargin irregularly waved, whitish-grey, suffusedly irrorated with fuscous, except towards base; a minute black dot in middle of wing; an indistinct waved line from costa near apex to about two-thirds inner margin; cilia as in forewings, but slightly paler.

One specimen, Hallett's Cove, S.A., in November; larva feeding on *Muehlenbeckia adpressa.*

Diastictis odontias, *n. sp.*

Male, 36 mm. Head, palpi, and legs ochreous; posterior femora whitish; antennæ white-spotted with fuscous; pectinations six, fuscous-tinged, apical-fifth simple; thorax ochreous-grey. Abdomen whitish-ochreous, with a double series of dorsal dots towards base. Forewings triangular; costa straight; hindmargin rounded, oblique, pale dove-colour; with numerous transverse ferruginous strigulae; costal edge yellowish-ochreous throughout, strigulated with blackish; a narrow ferruginous line from one-third costa to about one-third inner margin, strongly curved outwards near costa; a transverse black discal dot; a thick, straight, ferruginous line from about two-thirds costa to two-thirds inner margin, edged beyond throughout by a waved ferruginous line, included space paler than rest of ground-colour; a thick, waved, interrupted ferruginous line from five-sixths costa to anal angle, lower-half almost lost in general ground-colour; a waved hindmarginal line; cilia grey-whitish. Hindwings with hindmargin very strongly dentate; colour, discal dot, and markings as in forewings, but apex and part of hindmargin marked with

ochreous-orange and brown ; hindmarginal line black, distinct ; cilia white, tipped with black and ochreous at extremities of veins.

One specimen from Port Darwin. In appearance resembling somewhat a *Hypochroma*.

Diastictis (Selidosema) heterogyna, *n. sp.*

Male and female, 38-43 mm. Head, palpi, antennæ, thorax, and abdomen fuscous, abdominal segments blackish. Antennæ whitish-ochreous at base, pectinations seven, apical fifth filiform ; face black, with a whitish-ochreous median bar. Legs ochreous-whitish, irrorated with fuscous. Forewings elongate triangular, costa almost straight, hindmargin dentate, more strongly in female, rounded, oblique ; in female slaty grey, in male ochreous-fuscous; a short black oblique line from one-sixth inner margin obliquely outwards ; a black line from one-third inner margin direct to, but interrupted before apex ; in male ground-colour above this line is whitish-ochreous, below fuscous mixed with ferruginous and black, separation sharply defined ; a black line, tending to be double at origin, on posterior edge throughout, with a brown shade ; a short oblique dash on costa before apex, not in male, beneath which is a small black dot ; a thick black waved line from three-fourths inner margin to hindmargin below apex, thicker at extremities, and more distinct in female, irregularly edged posteriorly by a fine white line ; a fine black waved hindmarginal line ; cilia grey-whitish, barred with fuscous at extremities of veins ; a whitish basal line. Hindwings with hindmargin rounded, dentate, more strongly in female, colour and markings as in forewings ; a transverse black discal dot ; in the male, base and apex are suffusedly irrorated with fuscous, at extremity of suffusion is a transverse black linear discal dot ; hindmarginal line and cilia as in forewings.

Two examples, Parkside, at street lamps in May. This species is easily recognised by the well-defined longitudinal black line and curious division of colour of forewings. It is near *excursaria*, Gn.

Diastictis (Selidosema) chionomera, *n. sp.*

Male, 41 mm. Head, palpi, thorax, and abdomen brownish-ochreous ; face blackish, lower-third white ; thorax with two straight transverse dark-brown bands. Legs fuscous. Antennæ fuscous, pectinations six. Forewings triangular ; costa straight, hindmargin hardly waved, obliquely bowed ; light-fuscous, irrorated with ochreous and whitish ; costa strigulated with fuscous ; a curved oblique blackish line from one-third costa to one-sixth inner margin ; a thick blackish streak or shade, thicker on lower-half, suffusedly continued to hindmargin below apex

from one-third inner margin, posterior edged with yellowish ; a transverse blackish discal dot before this ; a rather thick suffused line from above anal angle to apex of shade ; a short black apical dash ; an interrupted waved, blackish hindmarginal line ; cilia grey-whitish, fuscous-tinged. Hindwings with hindmargin rounded, waved, colour as in forewings ; a white basal patch, containing a short black mark in middle ; a straight blackish shade from one-third inner margin to one-third costa ; a well-defined blackish lunate discal mark ; an interrupted row of black dots from two-thirds inner margin to four-fifths costa, sometimes connected with a fine black line ; a rather thick ochreous shade beyond and parallel ; a blackish shade from above anal angle to costa before apex, where it is broader, followed by a whitish subterminal line ; hindmarginal line and cilia as in forewings.

Underside of forewings dull ochreous-white, a well-defined blackish hindmarginal band from vein 2 to apex, broader at apex ; a large blackish discal dot in middle of wing ; hindwings as forewings, but discal dot much smaller.

One specimen at Burnside. Allied to *D. lyciaria*, Gn., but smaller ; differs especially in underside. It also has considerable superficial resemblance to large specimens of *D. excursaria*, Gn. The snow-white basal patch is a good and distinct character.

Diastictis (Selidosema) mesombra, *n. sp.*

Male, 38 mm. Head, face, palpi, and thorax yellowish-clay colour, thorax with a blackish suffused transverse median band. Abdomen and legs greyish. Antennæ fuscous, pectinations nine, apical-sixth simple. Forewings triangular, costa nearly straight, hindmargin almost straight, obliquely waved ; pale-ochreous-yellowish, suffused with fuscous, and blackish towards costa and base of inner margin ; an undulating brownish line from about one-third costa to one-third inner margin, marked on costa with black, and more strongly so on inner margin ; a similar more dentate line from middle of wing to middle of costa, with a strong projection outwards in middle, similarly marked on costa and inner margin, space between these lines marked with blackish on inner margin ; a black mark on costa at three-fourths, with a row of three or four black dots beneath ; a blackish subterminal shade tending to form into spots from costa near apex to anal angle, margined posteriorly with an interrupted whitish line ; a small suffused white mark between veins 7 and 8, near hindmargin, and just before shade ; an interrupted hindmarginal blackish line ; cilia fuscous, obscurely barred with white. Hindwings as forewings ; hindmarginal line and cilia as in forewings.

One specimen Fernshaw, Victoria. Somewhat allied to the preceding.

Diastictis (Selidosema) cremnodes, *n. sp.*

Female, 39 mm. Head, palpi, antennæ, thorax, and abdomen dark-fuscous, lower half of face with an indistinct median bar. Legs greyish, posterior and middle pair suffused above with fuscous. Forewings triangular; hindmargin strongly dentate, rounded, oblique; greyish-ochreous, densely strigulated with black, appearing almost black; three very indistinct lines, blacker, outwards curved; first from one-third of costa to one-third inner margin; second from middle of costa to beyond middle inner margin, passing through a black discal dot; third from three-fourths costa to anal angle; a waved black hindmarginal line; cilia whitish, obscurely barred with black. Hindwings with hindmargin strongly dentate, colour as forewings, a black interrupted line from costa near apex to anal angle, parallel to hindmargin; cilia as in forewings.

One specimen, Blackwood, in May. Nearest to *suasaria*, Gn., but larger and stouter built. The specimen before me not being in the best of condition, the description is necessarily to some extent defective.

Amelora idiomorpha, *n. sp.*

Female, 30 mm. Head, palpi, antennæ, thorax, abdomen and legs whitish-grey, sparsely sprinkled with black scales. Abdominal segments slightly ochreous-tinged. Forewings elongate triangular; costa straight, apex pointed, hindmargin obliquely rounded; grey-whitish, irrorated with light-fuscous and minute black scales; costal edge darker throughout; a narrow blackish waved shade from apex to below middle of disc above inner margin, bordered beneath throughout with a distinct narrow whitish shade; cilia fuscous, darker at tips. Hindwings whitish; cilia grey.

One fine specimen, Parkside (at a street lamp) in April. Very dissimilar from all the species described from Australia.

Chlenias melanostrepta, *n. sp.*

Male, 35 mm. Head, palpi, thorax, and legs ashy-grey-whitish, face moderately rounded, without projection, crest of thorax large and well-developed, anterior edge with an interrupted black line. Antennæ white, pectinations six, ochreous-tinged, abdomen whitish-ochreous, becoming ochreous on the three basal segments. Forewings elongate, narrow; costa gently arched; apex round-pointed; hindmargin obliquely rounded, ashy-grey-whitish; a black line from one-sixth costa obliquely outwards to before middle; a longitudinal black streak from base below middle to anal angle, attenuated anteriorly, and with a short angular projection upwards at origin, margined through-

out with a fine white line; veins tending to be outlined with black, especially towards hindmargin, where they are margined beneath with fine white lines; an interrupted black hindmarginal line; cilia grey-whitish. Hindwings with hindmargin rounded, opal white; hindmarginal line and cilia as in forewings.

One specimen (at light), at Blackwood, S.A., in May. Narrower-winged than *arietaria*, Gn., to which it seems allied, also without frontal projection. The black longitudinal streak distinguishes it at once from the other species.

Chlenias pachymela, *n. sp.*

Female, 50 mm. Head and thorax ashy-fuscous; crest blackish in front, whitish behind. Antennæ whitish. Abdomen ochreous-grey, beneath silvery-white. Legs fuscous, tarsi suffusedly banded with white. Forewings elongate, costa gently arched, hindmargin slightly waved; grey, suffusedly irrorated with whitish, and a few fuscous scales; lines rather obscure, first from one-third of costa to one-third of inner margin, slightly curved outwards, second from about two-thirds of costa to beyond middle of inner margin, a broad blackish suffused streak from base of costa to apex, leaving costal edge of ground-colour for its own width; an indistinct whitish dentate subterminal line; a blackish hindmarginal line; cilia greyish. Hindwings with hindmargin irregularly waved, apex and anal angle rather prominent; grey-whitish, darker posteriorly; a suffused fuscous discal dot, hindmarginal line and cilia as in forewings.

Immediately known by the broad, blackish longitudinal streak. One specimen from Melbourne, Victoria.

Chlenias gonosema, *n. sp.*

Male, 36 mm. Head palpi, thorax and legs fuscous, face rounded, rather prominent. Antennæ pale ochreous, pectinations five. Abdomen grey, yellowish-tinged. Forewings elongate triangular, costa nearly straight, rounded at apex, hindmargin hardly waved oblique; light fuscous, mixed with dark fuscous, whitish and ochreous; veins more or less marked with whitish; interneural spaces blackish towards hindmargin; lines dentate; dark-fuscous; first from one-fourth of costa to one-third of inner margin, tolerably thick throughout, well-defined on costa; second from two-thirds of costa to beyond middle of inner margin, with a strong concavity above middle; a suffused dentate whitish subterminal line; a black hindmarginal line, interrupted by the whitish streaks on veins; cilia greyish fuscous. Hindwings with hindmargin sinuate-rounded; grey whitish, posteriorly fuscous tinged; cilia whitish.

Allied mostly to *arietaria*, Gn., but distinguished from it by the absence of the horny projection on forehead, antennal pectinations, narrower forewings, and other details. One specimen from Toorak, Victoria.

Chlenias (?) rhyncophora, *n. sp.*

Female, 42 mm. Head, palpi, antennæ, thorax, abdomen, and legs ashy-grey, minutely irrorated with black, palpi very long, nearly four; thorax with a black longitudinal streak throughout. Forewings elongate, costa arched, hindmargin obliquely rounded; ashy-grey whitish, minutely irrorated with blackish; a short black longitudinal streak in middle of wing, another more distinct beneath and before it; indications of a line from costa at two-thirds towards inner margin; a strongly dentate line from apex to anal angle, obscurely edged posteriorly with whitish; a black hindmarginal line; cilia ochreous-fuscous, tips whitish. Hindwings grey-whitish, darker posteriorly; an obscure black dot at end of cell; cilia as in forewings.

Blackwood, S.A., one specimen, in August. An abnormal-looking species, not a true *Chlenias*, but in the absence of the male I place it here provisionally. Most probably a new genus will be required to receive it.

Smyriodes heterochaes, *n. sp.*

Male, 42 mm. Head, palpi, legs, abdomen, and thorax slaty-grey, thorax with a black anterior band immediately behind crest, tarsi ringed with whitish. Antennæ whitish, pectinations six, reddish-tinged. Forewings elongate, costa straight, hindmargin bowed, strongly dentate, oblique; slaty-grey; an outwards angulated black line at base; a black line from one-fourth costa to before middle of inner margin, angulated outwards in middle, space between the two lines more or less filled with ochreous, sometimes entirely suffused with ground-colour; a short oblique black streak on costa before middle; a black irregular line from beyond middle of costa to inner margin at two-thirds, angulated outwards above middle; a broad ochreous patch beyond, from costa to inner margin, containing three sharply-defined longitudinal black streaks, one above and two below middle, sometimes suffused with ground-colour; a strongly waved well-defined black hindmarginal line; cilia ashy-fuscous, with a whitish line at base, and obscurely barred with blackish. Hindwings with hindmargin subdentate; dark-fuscous, lighter towards base; an obscure black dot in middle of wing; a zigzag line from three-fourths of costa to anal angle; cilia whitish, with a greyish median line.

Quite distinct from the other two known-species; two specimens at Blackwood, beaten from *Eucalyptus rostrata*, in August.

Smyriodes carburaria, *Gn.*

Chlenias carburaria, Gn., X., 238; Meyr., Proc. Linn. Soc. N.S.W., VI., 666 (1891).

Male, 42-45 mm. Head and thorax dark cinnamon-brown. Thorax with a transverse anterior band of two longitudinal black lines meeting anteriorly, crest of thorax well developed, blackish. Antennal pectinations six. Abdomen greyish-fuscous, segments faintly ochreous-tinged. Legs dark-fuscous, femora densely hairy, tarsi ringed with whitish at apex of joints. Forewings elongate, dilated posteriorly; costa arched at base, thence straight; apex pointed, hindmargin strongly dentate, bowed, oblique; dark cinnamon-brown; two black lines, first, twice strongly and sharply angulated outwards with indications of a third angulation on inner margin, first from costa at one-third to inner margin at one-third: second, strongly dentate from costa at two-thirds to inner margin at two-thirds; an indistinct row of elongate spots from costa near apex to anal angle, between veins; space between second line and spots much paler than ground-colour, in one specimen the whole area beyond the second line is of this pale colour; a black dentate hindmarginal line, interrupted at extremities of veins; veins tending to be outlined with dark-fuscous; cilia dark-fuscous, tips whitish. Hindwings with hindmargin rounded, strongly dentate; reddish-fuscous, basal-half grey-whitish; a black discal dot; a very obscure dentate line from two-thirds of costa to two-thirds of inner margin, indicating a continuation of second line of forewings; hindmarginal line and cilia as in forewings.

Two specimens (at light) in May at Blackwood. As Mr. Meyrick had not seen this species until I sent it him, I am at his suggestion re-describing and referring it to the proper genus.

Pyralidina.

PYRALIDIDÆ.

Hednotodes callichroa, *n. sp.*

25 mm. Head, palpi, and abdomen yellow, abdominal segments fuscous, tip of second and tip of terminal joint of palpi fuscous, face and thorax white, thorax with a dark fuscous spot on each shoulder, and two broad blackish transverse bands placed anteriorly and posteriorly. Legs ochreous-whitish, anterior tibiæ and tarsi infuscated with white apical rings. Forewings moderate, dilated, hindmargin almost straight; snow-white, with dark fuscous markings; a narrow streak along costa throughout, a thick straight fascia near base; a similar from one-third costa to one-third inner margin, slightly waved; a thicker irregular fascia from three-fourths costa to about

two-thirds inner margin, strongly angulated outwards below middle and emitting two teeth so as to touch hindmarginal fascia; a thick hindmarginal fascia strongly curved inwards above anal angle; a hindmarginal row of white lunules; cilia whitish. Hindwings orange; a broad dark fuscous hindmarginal band; broadest at apex, obsolete on lower-half of hindmargin; cilia orange, along band fuscous.

Mr. Meyrick, to whom I submitted this specimen, informs me that it is referable to this family and is a very abnormal species; it is very handsome and somewhat resembles a *Hednota*. One specimen from Arthurton, Yorke Peninsula, in September.

BOTYDIDÆ.

Sedenia erythrura, *n. sp.*

Female, 28 mm. Head, palpi, antennæ, thorax, and abdomen whitish-ochreous, reddish-tinged, palpi whiter beneath. Anterior legs fuscous (others broken). Forewings elongate, posteriorly dilated; costa slightly sinuate beyond middle; hindmargin rounded, oblique, whitish-ochreous, reddish-tinged with darker reddish markings; a thick suffused streak along costa from base to apex, leaving extreme costal edge ochreous-whitish; a rather large discal dot beyond middle, indistinctly centred with white; a streak from five-sixths costa to anal angle, slightly curved inwards; a small patch at anal angle touching this streak; a moderate hindmarginal fascia from apex to anal angle, enclosing a well-defined streak of ground-colour between this and preceding line; cilia ochreous-whitish, towards base tinged with reddish, and mixed with blackish towards tips. Hindwings ochreous-whitish, reddish-tinged; a suffused reddish hindmarginal line; cilia as in forewings, but becoming paler towards anal angle. The markings on the posterior portion of wing being in part obliterated, the description may need expansion.

One specimen, Belair, December 28, 1892.

SCOPARIADÆ.

Scoparia leucomela, *n. sp.*

Male and female, 22-25 mm. Head, palpi, thorax, antennæ, and legs fuscous; legs suffusedly irrorated with, and posterior pair wholly, white; abdomen dark-grey, basal segment orange. Forewings elongate, posteriorly dilated, costa nearly straight, hindmargin obliquely rounded, silver-grey, costal edge very narrowly whitish throughout; a blackish longitudinal line above middle, from base to three-fourths, where it is lost in the ground-colour; all veins tending to be outlined with black, interspaces filled with white, giving the wing the appearance of alternate

black and white lines ; a fine black line along inner margin from middle to anal angle ; cilia ashy-grey-white, mixed with black. Hindwings iridescent-grey ; cilia iridescent white, with a dark fuscous basal line.

One specimen on *Eucalyptus* sp. ("Stringybark"), the bark of which is similar in colour to the insect. April 3, 1893, at Blackwood, S.A, ; also one specimen, Eucla, W.A., in May, 1892. It is an exceedingly neat-looking insect.

CRAMBIDÆ.

Hednota crypsichroa, *n. sp.*

Male and female, 24-25 mm. Head, palpi, and thorax whitish-ochreous, fuscous-tinged, palpi nearly three times as long as head, fuscous-tinged beneath. Abdomen ochreous, sometimes fuscous-tinged. Thorax with a suffused blackish mark on each side, legs whitish, fuscous-tinged. Forewings, moderately dilated, hindmargin slightly rounded oblique ; varying from ochreous-white to fuscous ; a suffused blackish streak along fold almost from base to anal angle, sometimes absent or interrupted posteriorly ; a transverse elongate discal spot, outlined with blackish, beyond middle, generally suffusedly margined on either side with fuscous patches ; a row of semi-confluent blackish spots from just above anal angle to near apex, ending in a suffused fuscous triangular patch on costa, which contains a short streak of white ; an indistinct row of elongate spots on veins along hindmargin ; cilia whitish, with three lines of dark-fuscous and a narrow basal line edged with dull-leaden. Hindwings greyish ; cilia pale-greyish, with a darker line near base.

Blackwood, Parkside, and Belair, usually at light, in March and April. An obscure though distinct species.

PHYCITIDÆ.

Lasiosticha microcosma, *n. sp.*

Male, 13 mm. Head, palpi, antennæ, thorax, abdomen, and legs fuscous, irrorated with whitish, terminal joint of palpi black, anterior tarsi suffusedly irrorated with white, anal tuft ochreous-yellow. Forewings triangular, costa gently arched, hindmargin hardly rounded oblique ; dark fuscous-reddish ; a black streak at base, suffused on inner margin ; a thick black line slightly curved from one-third to middle of inner margin, edged anteriorly with a line of metallic-leaden scales, between basal line and this there is a large patch of leaden-metallic scales, posteriorly edged by a line of ground-colour, broadly dilated below middle ; an angulated black line from four-fifths costa to three-fourths inner margin, edged posteriorly by a line of leaden-metallic scales and

anteriorly by a suffused patch of same colour; a sphenoid mark on middle of costa reaching half-way across wing, centre filled with ground colour, a suffused and interrupted blackish hindmarginal line; cilia greyish, with a black line near base. Hindwings with hindmargin rounded, apex prominent: orange; a narrow fuscous hindmarginal line continued to apex and costa, where it is broader, obsolete at anal angle; cilia fuscous, with two whitish lines.

A handsome species. One specimen on a burnt log at Blackwood, S.A.

Tortricina.

TORTRICIDÆ.

Capua leucospila, *n. sp.*

Male and female, 14-15 mm. Head, antennæ, thorax, and abdomen dark-fuscous. Antennæ annulated with white. Palpi whitish-ochreous, externally fuscous. Legs fuscous, tibiæ banded with whitish. Forewings rather broad, somewhat dilated posteriorly; costa gently arched, apex obtuse, hindmargin oblique, ochreous-fuscous minutely strigulated with whitish and blackish, costa and inner margin more strongly so; outer edge of basal patch represented by a black line from one-fourth of costa to before one-half of inner margin, strongly indented below middle; central fascia light reddish-fuscous, well-defined, oblique, anterior edge from one-third of costa (almost touching basal patch) to beyond middle of inner margin, twice angulated inwards, posterior edge from same point as anterior, on costa, curved outwards to about two-thirds of disc, thence outwards to anal angle; a very distinct white spot, outlined with black, on upper portion of posterior edge of central fascia; five large quadrate spots on costa, separated by similar whitish spots, between central fascia and apex; a black hindmarginal line; cilia ochreous, with a black basal and fuscous median line, and a black tooth at apex. Hindwings greyish-fuscous, spotted with darker; cilia grey, with darker basal and terminal lines.

Easily separated by the well-marked white posterior spot. Two specimens, Golden Grove, in September; and two specimens at Glen Osmond, in October.

Capua ammochroa, *n. sp.*

Male and female, 17 mm. Head and thorax yellowish-ochreous, thorax with one or two black scales posteriorly. Palpi whitish-ochreous, fuscous beneath, and with a fuscous band at base. Antennæ and abdomen fuscous. Legs whitish-ochreous. Forewings moderate, broad; costa strongly arched, hindmargin obliquely rounded; pale whitish-ochreous, with scattered black scales; two or three black scales towards base; outer edge of

basal patch indicated by two well-defined black spots at about one-fourth, median patch very indistinct, slightly darker than ground-colour, anterior edge from one-third of costa to about middle of inner margin, posterior from before middle of costa to anal angle, with a deep wedge-shaped indentation in middle, edged somewhat by a few black scales; a small patch of black scales in disc beyond; costa and inner margin strigulated throughout with well-defined black dots, those on apical portion of costa being larger and more tooth-like; cilia pale-ochreous, with an indistinct median line at anal angle blackish. Hindwings and cilia fuscous, spotted with darker colour; cilia with a well-marked darker basal line.

Three specimens at Glen Osmond, and two at Blackwood, S.A., in October. This is a difficult species to get in good condition, but when fresh it is a very neat insect.

DICHELIA THERMATERIMMA, *n. sp.*

Male and female, 12 mm. Head, antennæ, thorax, and legs dark fuscous, tibiæ and tarsi with whitish rings, posterior legs greyish, palpi ochreous-grey suffused with fuscous, abdomen grey. Forewings elongate, moderately dilated; dark fuscous; basal patch well-defined, blackish, limited by a blacker line from one-fourth costa to one-third inner margin; a suffused blackish line from about middle of costa to about middle of inner margin; whole space of wing beyond this darker fuscous; space between last mentioned line and basal patch varying from dull-ochreous to reddish-ochreous, with a few waved obscure transverse blackish lines; a row of about seven or eight small ochreous white quadrate spots along costa throughout; cilia fuscous, tips greyish. Hindwings dark-grey, spotted with darker; cilia grey, with a darker basal line.

Always recognisable by the patch of reddish colour after basal patch. Glen Osmond, Blackwood, and Parkside, S.A., during April; rather common. Mr. Meyrick has it from Tasmania.

CONCHYLIDÆ.

HETEROCROSSA MIMICA, *n. sp.*

Male and female, 18-20 mm. Head, palpi, antennæ, thorax, and abdomen white. Antennæ annulated with fuscous, basal joint of palpi beneath fuscous. Thorax with a well-defined anterior brown band. Legs dark-fuscous, posterior pair whitish, all tarsi banded with white. Forewings elongate, posteriorly somewhat dilated, costa gently arched, apex rounded, hindmargin very obliquely rounded; white; a brownish streak on costa from base to one-fifth; four blackish equidistant oblique spots, occupying median-third of costa; an irregular triangular patch of mixed

blackish-reddish and leaden-metallic scales from inner margin at one-fourth to before anal angle, anterior edge marked by a curved black streak containing two tufts of raised black scales; a curved fuscous line from fourth costal spot to near posterior extremity of triangular patch reaching inner margin; anteriorly margined throughout by a distinct white line; a variable irregular suffusion between last three costal spots, reaching more than half-way across wing, anteriorly partly enclosing an oval black spot ringed with whitish, posteriorly bordered by a reddish transverse patch margined laterally with whitish; a suffused leaden-metallic patch above anal angle; a row of large suffused leaden-metallic spots along hindmargins and apical fourth of costa; a row of distinct black dots anterior and parallel to these; cilia leaden-metallic, with a darker median line. Hindwings pale grey, thinly scaled (in male with a large patch of dense ochreous scales occupying basal third of wing); cilia paler, with a whitish median line.

Two specimens at Parkside and two at Blackwood. In repose this species has a wonderful superficial resemblance to birds' droppings. It is a very beautiful insect, and is met with sparingly. It is most allied to the New Zealand *H. gonosemara*, Meyr.

Tineina.

GELECHIADÆ.

Gelechia leucocephala, *n. sp.*

Female, 19 mm. Head, palpi, and thorax snow-white. Thorax with an anterior blackish band, palpi with a blackish ring at apex of basal and terminal joints. Antennæ and abdomen dark-fuscous. Legs blackish, posterior pair light-fuscous. Forewings moderate, rather narrow; costa gently arched; apex round-pointed; hindmargin very oblique; fuscous, coarsely strewn with black and whitish scales; a snow-white spot at base of wing; markings black, suffused; a spot on inner margin at base; a spot in disc at one-third, another obliquely beyond and beneath it; a suffused elongate patch on costa about middle; a transverse spot above anal angle; a paler tooth of ground-colour on costa at three-fourths; cilia whitish-ochreous, with rows of black points. Hindwings dark-grey; cilia grey-whitish.

One example at Parkside, October 17th. The white head and thorax contrast effectively with the dark colour of forewings, and make the species easy of recognition.

Gelechia thermochroa, *n. sp.*

Male and female, 16-17 mm. Head dark-fuscous, postorbital rims yellowish, palpi ochreous-yellow, second joint infuscated

towards apex, apex of terminal joint whitish. Antennæ yellowish-ochreous, annulated with black. Thorax ochreous-yellow, with an anterior black band. Abdomen dark-fuscous. Legs ochreous-fuscous, with whitish tarsal rings. Forewings rather narrow, moderate; costa arched near base, thence straight; apex rounded; hindmargin very obliquely rounded; deep-ochreous, with well-defined black markings; a rather thick fascia at base, continued along inner margin to about one-fourth; a few scattered scales along inner margin; a minute dot on costa at one-sixth; a large quadrate dot in disc at one-third, and a similar one above anal angle, anterior edge sharply defined, posterior suffused; about five dots along costa from immediately above first quadrate spot to apex; between first and second costal spots, but below, is a small black spot; hindmarginal area suffusedly blackish, broader at apex; cilia dark-fuscous. Hindwings blackish; cilia dark-fuscous, with a darker basal line.

A distinct species. Two specimens from Gisborne, Victoria.

GELECHIA MACROPLACA, *n. sp.*

Male, 14 mm. Head palpi, antennæ and thorax dark-fawn. Legs fuscous. (Abdomen broken.) Forewings elongate, hardly dilated; hindmargin obliquely rounded; dark-fawn colour; a black fascia, somewhat edged with white, from one-third of costa, not reaching inner margin, slightly dilated on costa; a black spot at base of costa and a similar one beyond, both connected by a fine line along costa; a series of blackish dots along apical-fourth of costa, and continued along costa around hindmargin to anal angle, first three more conspicuous; a minute black dot on inner margin at two-thirds, and a smaller one above, surmounted by a small white spot; cilia clay-colour, base sprinkled with darker. Hindwings dark-grey; cilia grey, with a darker line near base.

Gisborne, Victoria. One specimen received from Mr. G. Lyell, junr.

GELECHIA THANATODES, *n. sp.*

Female, 10 mm. Head, antennæ, palpi, thorax, and legs dark-fuscous, suffusedly sprinkled with white, especially the legs, tarsal joints ringed with white, hairs of posterior legs yellowish. Abdomen coppery-fuscous. Forewings elongate-oblong, dilated in middle, hindmargin bowed, oblique, dark-fuscous, minutely irrorated with whitish, so as to appear ashy-grey-whitish; a small black mark along basal-fifth of inner margin; an oblique transverse series of about four or more elongate black streaks from one-fifth costa to one-fourth of inner margin; a very oblique, somewhat interrupted blackish fascia from middle of costa to anal angle; a somewhat curved series of black spots from be-

neath costa at two-thirds, continued round, and parallel to hindmargin above anal angle, the one on the angulation being the longest; a fine black hindmarginal line; cilia grey, tips whitish. Hindwings and cilia dark-coppery-fuscous.

Parkside. One specimen. Certainly allied to *Gel. loxodesma*, Meyr., of which it may prove to be a variety, but it is such a different-looking insect (especially in the hindwings) that I have decided to give it a distinctive name.

GELECHIA CENTROSEMA, *n. sp.*

Male and female, 12 mm. Head, palpi, antennæ, and thorax golden-ochreous-brown, sides of thorax whitish, face whitish palpi whitish internally. Legs grey-whitish, anterior pair infuscated externally. Abdomen dark-fuscous, anal tuft whitish. Forewings narrow, costa hardly arched, apex somewhat pointed, hindmargin extremely obliquely rounded; golden-ochreous; costa very narrowly whitish throughout; a well-defined straight whitish-ochreous median streak from base to apex, anteriorly attenuated, margined beneath with darker ground-colour; cilia dark-fuscous. Hindwings fuscous; cilia light fuscous, lighter on costa.

Three specimens, Gisborne, from Mr. G. Lyell, jun.

POGONIAS EURYPLACA, *n. sp.*

Male, 10 mm. Head, antennæ, palpi, and legs dark-fuscous; tarsi obscurely ringed with whitish, terminal joint of palpi with four whitish rings. Antennæ somewhat annulated with white. Thorax ochreous-white, patagia more ochreous with a quadrate-fuscous spot posteriorly. Abdomen blackish, anal tuft yellowish. Forewings narrow, lanceolate, blackish; an ochreous-white subquadrate patch on inner margin beyond middle, three obscure tufts of blacker scales placed triangularly, first on anterior portion of patch, second obliquely above, third near base; cilia dark-fuscous, with a few grey scales. Hindwings lanceolate, fuscous; cilia greyish.

One specimen from *Banksia marginata*, at Highbury, January 26, 1893.

XYLORYCTIDÆ.

CRYPTOPHAGA AGLAODES, *n. sp.*

Female, 50 mm. Head, antennæ, thorax and palpi white, second joint internally black at base. Legs whitish, tarsi ringed with black. Abdomen whitish; second segment broadly orange-red, others anteriorly suffused with fuscous. Forewings moderate, oblong, costa gently arched, apex rounded, hindmargin rather oblique; 2 from three-fourths; pale whitish-ochreous, slightly infuscated; costa towards apex slenderly blackish; a small

well-defined black dot in disc at one-third, and another similar obliquely beyond, at about middle; cilia whitish-ochreous, with a row of well-defined black spots at extremities of veins, and continued along apical-fourth of costa. Hindwings whitish-ochreous, 6 and 7 stalked; cilia as in forewings.

One specimen, bred from *Casuarina quadrivalvis*, at Arthurton, Yorke Peninsula, in September. Nearest *C. lurida*, Meyr., but differs by the sparse markings and wholly whitish hindwings.

Catoryctis polysticha, *n. sp.*

Female, 26 mm. Head, thorax, and antennæ fuscous, collar white, palpi fuscous, second joint externally whitish. Legs whitish. Abdomen fuscous, segmental margins dull ferruginous. Forewings elongate, costa rather strongly arched, apex somewhat pointed, hindmargin very oblique; 7 present; slaty-fuscous; markings white outlined with blackish; a moderate streak along costa from base to beyond two-thirds posteriorly strongly attenuated and leaving extreme costal edge fuscous towards base; a moderate streak from base direct to middle of hindmargin, attenuated at ends; a similar streak immediately beneath, from base to anal angle attenuated posteriorly; three rather short fine lines towards hindmargin, between last two streaks; a slender line from three-fourths of disc to costa before apex; a similar but shorter streak beneath to apex; some obscure whitish scales along inner margin indicating an unexpressed streak; cilia fuscous. Hindwings grey, posteriorly fuscous-tinged; cilia whitish with a dark-fuscous basal line.

Intermediate between "*subnexella*," Walk., and "*tricrena*," Meyr. One specimen (at light) in November, at Parkside, S.A.

Lichenaula monosema, *n. sp.*

Male and female, 12-16 mm. Head and thorax white, antennæ black. Palpi black, base of second and terminal joint white. Abdomen ochreous-fuscous. Legs whitish, slightly infuscated, posterior pair pale ochreous-yellow. Forewings elongate, costa moderately arched, apex pointed, hindmargin very obliquely rounded; shining white, slightly ochreous posteriorly; extreme costal edge blackish towards base; a distinct black spot in middle of wing above anal angle; cilia ochreous-whitish, base darker. Hindwings fuscous; cilia ochreous-white, base darker.

Var. A.—Whole of forewings suffused with light ochreous-yellow.

Parkside, Blackwood, Highbury, &c., not uncommon during December, January, and February. A neat little species, not unlike a *Scieropepla*, which I took it to be until corrected by Mr. Meyrick.

PHTHONERODES (?) LEUCOMERATA, *n. sp.*

Female, 17 mm. Head, palpi, antennæ, thorax, abdomen, and legs whitish; segments of abdomen fuscous-reddish. Forewings oblong, costa strongly arched towards base; hindmargin obliquely rounded; pale-ochreous; a suffused reddish patch of scales above inner margin near base; some scattered fuscous scales mixed with white from base along inner margin to anal angle; an indistinct irregular line from one-fourth of costa to one-third of inner margin; a similar line from five-sixths costa to above anal angle, included space strongly irrorated with white, and all veins tending to be marked with black; cilia fuscous. Hindwings grey, paler towards base; cilia grey-whitish, with a dark basal line.

One specimen (at light), Parkside, S.A. In the absence of the male, it is impossible to refer this species with certainty to its genus.

XYLORYCTA CHIONOPTERA, *n. sp.*

Female, 36 mm. Head yellowish, palpi whitish, antennæ and legs fuscous, posterior pair ochreous; thorax whitish-ochreous. Abdomen greyish, segments dull-orange. Forewings elongate, costa gently arched, hindmargin obliquely rounded; shining snow-white; costal edge blackish from base to one-fourth, rest of costa orange; cilia shining snow-white. Hindwings light fuscous-grey; cilia white, ochreous-tinged at base. Underside of all wings suffused with orange, especially on margins.

One specimen, Fernshaw, Victoria. Whether this is a *Xylorycta* or *Cryptophaga*, I am unable to say in the absence of the male. It is very similar to *luteotactella*, Walk., but longer winged.

PROCOMETIS (?) ORTHOSEMA, *n. sp.*

Female, 19 mm. Head, palpi, antennæ, thorax, abdomen and legs snow-white, two basal segments of abdomen orange, other segmental margins fuscous. Forewings elongate, rather narrow, costa gently arched, apex pointed, hindmargin strongly oblique; shining snow-white; a golden-ochreous line along costa from base to near apex, finely attenuated anteriorly; a broad golden-brown longitudinal line in centre of wing from base to apex, attenuated posteriorly; cilia snow-white, except on streak. Hindwings and cilia shining snow-white.

One specimen, Parkside, in October; also from Gippsland, Victoria, in February; a fine and distinct species. I think it is rightly referred to this genus, but absence of male makes it doubtful.

AGRIOPHARA LEUCOSTA, *n. sp.*

Male and female, 24-27 mm. Head and thorax ashy-grey-

whitish, palpi whitish, apex of terminal joint fuscous. Antennæ fuscous, basal-fourth annulated with white. Abdomen dark-grey, beneath snow-white. Legs white, tarsi with blackish apical rings. Forewings moderate, in female more elongate, costa gently arched, apex rounded, hindmargin obliquely rounded ; ashy-grey-whitish ; costal edge snow-white throughout ; a faint short oblique blackish streak from costa at one-fourth, and another similar before middle ; an indistinct longitudinal streak from near base to above anal angle ; a curved series of faint blackish dots from costa at three-fourths to anal angle parallel to hindmargin ; cilia fuscous, at base chequered with black and white points. Hindwings grey ; darker in female ; cilia grey, with two darker parting lines.

Two specimens, Parkside, October 18 ; beaten from *Eucalyptus rostrata*. Although most of the species of this genus are extremely similar, this species is readily known by its white costal edge. The markings of the female are more pronounced.

AGRIOPHARA LEPTOSEMELA, *n. sp.*

Male, 18 mm. Head, antennæ, and thorax dark-fuscous, post-orbital rims white. Palpi fuscous, apex of second joint white. Abdomen grey. Anterior and middle legs dark-fuscous with whitish tarsal rings, posterior pair grey-whitish, tarsi fuscous with whitish rings. Forewings elongate, rather narrow, costa gently arched, apex rounded, hindmargin obliquely rounded ; ashy-grey, with well-defined black markings ; veins tending to be streaked with blackish ; a suffused spot on costa at about one-third ; another similar on costa before middle, both indicating unexpressed fasciæ ; a slender line from base of costa to anal angle ; another similar immediately beneath, but not reaching base or anal angle, and a third similar streak from base to near anal angle, terminating in a suffused patch of scales ; a suffused dot midway in disc near termination of first line and resting on its upper extremity ; a rather thick suffused streak at termination of first streak to below middle of hindmargin ; a few scattered black scales above and below this ; cilia grey, basal-half blackish with a few white points. Hindwings whitish-grey, darker posteriorly ; cilia grey, with distinct darker basal line.

One specimen, Parkside, in October. Between *cinerosa*, Rosen., and *axesta*, Meyr., but distinct from either.

ŒCOPHORIDÆ.

HELIOCAUSTA IOZONA, *n. sp.*

Male, 32 mm. Head, thorax, and antennæ greyish-ochreous. Antennæ strongly tinged with carmine basally, thorax with a

posterior carmine spot. Palpi ochreous-whitish, apex of second and terminal joints carmine-tinged. Legs ochreous-white, anterior and middle pair carmine-tinged. Abdomen ochreous-whitish, segments suffused with orange-fuscous. Forewings oblong, rather broad; costa strongly arched near base; hindmargin somewhat sinuate, rounded beneath; greyish-ochreous; costa broadly carmine throughout; inner margin carmine from base to one-fourth, followed by a few carmine scales; a broad fuscous carmine, nearly straight, oblique band from one-third of costa to middle of inner margin, dilated beneath, anterior edge well defined, posterior somewhat suffused; a fuscous-carmine suffused dot in disc at one-third, and a larger one more suffused obliquely beneath; indications of a curved series of fuscous carmine dots from above anal angle to two-thirds across wing; cilia fuscous-carmine, mixed with greyish-ochreous, especially around anal angle. Hindwings ochreous-whitish, posteriorly carmine-tinged, more pronounced at apex; cilia whitish-ochreous, with a grey parting line at apex. Underside of forewings, with costa and posterior two-thirds, strongly suffused with rosy.

One specimen, Blackwood, S.A., at light, in May. A very handsome species, having the fascies of a *Euchætis*. It is exceptionally distinct from all others known to me by the broad band of forewings.

HELIOCAUSTA EUSPILOMELA, *n. sp.*

Male, 28 mm. Head, palpi, antennæ and thorax ochreous-fuscous, thorax anteriorly darker-fuscous. Palpi externally white. Face white. Legs ochreous-whitish, faintly carmine-tinged. Abdomen fuscous. Forewings moderate, costa moderately arched, more strongly towards base, apex obtuse; hindmargin almost straight, slightly rounded; ochreous-fuscous; costa narrowly pale-carmine throughout; markings rather obscure; three black dots at base in a line between costa and inner margin; a tranverse row of black dots from beneath costa at one-third to middle of inner margin, from apex of these proceeds an outwardly curved row of similar dots to about anal angle; immediately beyond this is another strongly-defined curved row of similar dots ending at anal angle; a hindmarginal row of black dots; cilia greyish-ochreous, with a darker parting line. Hindwings and cilia pale grey-whitish.

One specimen, Parkside (at light), in October. An obscure looking species. Nearest to *severa*, Meyr.

EUCHÆTIS CRYPSICHROA, *n. sp.*

Male, 23 mm. Head, palpi, antennæ, thorax and abdomen greyish-ochreous, face whitish; palpi externally whitish. Legs ochreous-whitish, anterior and middle pair (except coxæ)

carmine-tinged. Forewings moderate, costa rather strongly arched especially towards base, hindmargin almost straight, slightly sinuate, rounded beneath; greyish-ochreous; costal edge carmine throughout, extreme costal edge ochreous-grey-whitish from about one-third to apex; a few ferruginous scales along inner-margin near base; a darker ferruginous spot in disc at one-fifth, and another immediately below it, a large transverse fuscous-carmine blotch occupying median third of wing, anterior edge inwards curved from about one-fourth of costa to about middle of inner margin, posterior edge from near apex to anal angle strongly curved inwards; on centre of posterior edge of this patch is a well-defined ferruginous spot; the patch is bounded on either side by a variable reddish suffusion; an irregular curved row of ferruginous spots from anal angle and ending in patch above middle; cilia dark-fuscous carmine, tips whitish, round anal angle wholly grey-whitish. Hindwings pale-yellowish; cilia paler, with a dark-grey basal line.

One specimen, Blackwood, S.A., beaten from *Eucalyptus*, sp. ("Stringybark") in October. Apparently most allied to *metallota*, Meyr., but without any white spots.

EUCHÆTIS SARCOXANTHA, *n. sp.*

Female, 20 mm. Head, palpi, legs, antennæ, abdomen, and thorax ochreous-yellow, antennæ and anterior legs carmine-tinged. Thorax with a suffused leaden-metallic posterior spot, edged posteriorly with dull carmine, shoulders carmine-fuscous. Forewings elongate-oblong, costa strongly arched, hindmargin bowed, oblique; ochreous-yellow, suffusedly irrorated with carmine, especially on edges of markings; markings leaden-metallic; a rather thick costal streak from base of costa throughout and continued uninterruptedly around hindmargin to anal angle, extreme costal edge carmine, becoming paler towards apex; a small ill-defined streak from base of costal streak; a semi-erect mark from inner margin near base reaching half-way across wing; an irregular triangular patch about third of costa, from which proceeds a row of four or five well-defined dots to near anal angle; a large irregular suffused patch from one-fourth of inner margin to anal angle occupying half of wing, in upper portion are three much darker discal spots, one larger about middle of wing, and two others beyond and placed one above the other, all edged posteriorly with a small patch of ground-colour, making them conspicuous; cilia on upper-half of hindmargin and apex reddish-orange, rest metallic-coppery. Hindwings and cilia orange.

A fine species; the apex of wing is so rounded that vein 7 seems to fluctuate between apex and hindmargin. Kewell, Victoria; one specimen, from Mr. J. A. Kershaw.

ZONOPETALA (?) STENOPTERA, *n. sp.*

Male, 15 mm. Head, thorax, and palpi white, thorax with a posterior fuscous patch or band; basal two-thirds of second joint of palpi dark-fuscous, legs and abdomen yellowish, anterior legs dark-fuscous. Forewings moderate, costa gently arched, hindmargin obliquely rounded; white, somewhat ochreous-tinged; costal edge pale-yellowish throughout, except at base and on second fascia; a narrow blackish fascia at base; a golden brown, rather narrow fascia, dilated on costa and inner margin from about one-fifth costa to middle of inner margin; an inwards curved similar fascia from three-fourths of costa to anal angle, anteriorly edged with blackish and well-defined, posteriorly suffused; a fine fuscous streak from apex of this to above anal angle; a suffused fuscous patch near apex, containing a blackish curved streak along hindmargin; cilia yellow, towards apex fuscous-tinged. Hindwings pale yellowish, with a distinct fuscous apical spot; cilia yellow, fuscous-tinged at apex.

Trafalgar, Victoria; two specimens received from Mr. J. A. Kershaw. As the heads of the specimens are covered partly with mildew, I am not quite certain as to the proper genus. It seems referable here.

EULECHRIA GYPSOTA, *n. sp.*

Male and female, 23-30 mm. Head, antennæ, and thorax greyish-fuscous. Palpi whitish, externally infuscated, especially at apex of basal joint. Abdomen ochreous-fuscous, segments greyish. Legs dark-fuscous, posterior pair ochreous-whitish. Forewings moderate, elongate; costa gently arched, apex rounded, hindmargin obliquely rounded; whitish, with fuscous markings somewhat suffused; a broad costal streak from base to two-thirds, posteriorly attenuated, leaving extreme costal edge white; a variable suffusion along inner margin from near base to near anal angle; a black dot in disc at one-third and another immediately below it, somewhat larger; a black dot in disc beyond middle resting on costal streak, a variable suffusion in middle of disc; a distinct crescentic mark beneath apex of central streak, immediately followed by a variable suffusion above anal angle; a curved interrupted streak from costa near apex to anal angle, indented beneath costa; a hindmarginal row of elongate dots; cilia grey-whitish. Hindwings rather dark-fuscous; cilia paler, with two indistinct grey lines.

Six specimens, Belair, S.A., November 14th; beaten from *Eucalyptus*. A conspicuous species belonging to the "Adoxella Group," *Meyr.*, but broader-winged.

EULECHRIA XANTHOCEPHALA, *n. sp.*

Male and female, 18-20 mm. Head orange, antennæ fuscous,

ciliations two. Palpi and thorax ochreous-whitish, palpi externally fuscous. Abdomen grey, anal tuft yellowish. Forewings elongate, moderate; costa gently arched, apex somewhat pointed; hindmargin rounded, oblique; shining white, somewhat yellowish-tinged, especially round margins; costal edge blackish at base; markings blackish, well-defined; a small dot in middle of wing; a similar spot before and below it; a larger spot in disc at about two-thirds; a similar spot at apex, and a longer one placed obliquely between these, but nearer to apical one; cilia ochreous-white, basal-half yellowish-tinged. Hindwings grey, cilia as in forewings.

Several specimens at Blackwood and Highbury in March. Allied to *elæota*, Meyr., but without any costal streak, and the dots differently placed. In one specimen veins 4 and 5 of the forewing are very closely approximated at base.

Eulechria adelphodes, *n. sp.*

Male and female, 22-25 mm. Head, palpi, antennæ, thorax, and legs dark fuscous, palpi irregularly suffused with whitish, coxæ of anterior legs white. Antennæ obscurely annulated with white ciliations. Abdomen greyish-fuscous, segmental margins somewhat ochreous. Forewings elongate, costa somewhat sinuate in middle, hindmargin obliquely rounded; dark-fuscous, irregularly mixed with ashy-grey-whitish; markings very suffused, hardly traceable; a very thick black streak from base to middle of disc, where it meets a tolerably well-defined small patch of white scales; from lower extremity of this streak proceeds a narrow black interrupted line from base to near anal angle; a strongly-curved row of elongate black marks from three-fourths of costa to three-fourths of inner margin, those on upper portion more elongate; a hindmarginal row of elongate spots; cilia ashy-grey-whitish, base sprinkled with black. Hindwings dark-fuscous; cilia grey, with darker basal and terminal lines.

Very near "*athletis*" and "*dryinodes*," Meyr., but markings much thicker, hindwings darker and stronger built. On bark of *Eucalyptus rostrata*, where they are difficult to discern; taken at Parkside, S.A., commonly in May.

Eulechria lithodora, *n. sp.*

Male, 16 mm. Head, palpi, thorax, antennæ, and abdomen slaty-grey, posterior legs greyish-ochreous. Antennæ whitish towards base, ciliations two. Forewings moderate, costa slightly arched, hindmargin obliquely rounded, slaty-grey; a narrow narrow whitish costal streak from very near base to apex; cilia pale slaty-grey, tips whitish. Hindwings dark-grey; cilia grey-whitish, basal half fuscous, lighter towards anal angle.

A neat-looking species, having a silky appearance, and somewhat the facies of a *Philobota*. One specimen at Blackwood in November.

LINOSTICHA CHRYSOLOMA, *n. sp.*

Male, 10 mm. Head, palpi, antennæ, thorax, and abdomen blackish, palpi internally whitish, second joint with a white apical ring, terminal joint spotted with whitish at base. Legs dark fuscous, posterior pair yellow, tibiæ and tarsi ringed with whitish. Forewings with costa slightly arched, apex rounded, hindmargin obliquely rounded; dark-fuscous; cilia dark-fuscous, tips lighter. Hindwings bronzy-fuscous; cilia golden-orange, apical-third fuscous-tinged.

An interesting little species, known by the small size and golden cilia of hindwings. One specimen, Parkside, in May.

LINOSTICHA DICHROA, *n. sp.*

Male and female, 17-22 mm. Head and thorax dark-fuscous, sprinkled with whitish. Palpi fuscous, minutely sprinkled with whitish. Antennæ fuscous, annulated with whitish. Abdomen blackish. Legs dark-fuscous, anterior tibiæ banded with white, posterior pair densely clothed with long orange hairs. Forewings elongate, slightly dilated posteriorly; costa nearly straight, somewhat arched near apex; apex round-pointed; hindmargin obliquely rounded; dark-fuscous, more or less irrorated suffusedly with whitish, so as to appear ashy-grey-whitish; a black dot in disc before middle, a second on fold obliquely beneath and beyond it, and a third in disc at two-thirds; a slender suffused blackish streak beneath costa from base to third discal dot, sometimes continued to anal angle; a hindmarginal row of suffused black dots, continued along apical third of costa; cilia ashy-grey-whitish, tips paler. Hindwings clear-orange, paler in some specimens; cilia fuscous-yellowish.

Common at Parkside, in October, on post and rail fence during a high wind. Probably dislodged from the adjoining *Eucalyptus rostrata;* the species is easily known by the hindwings. In the present genus vein 7 of the forewings extends to the apex, but in the present species it is continued slightly above, or more correctly to costa; though it is undoubtedly rightly referred.

NEPHOGENES XYLOCHROA, *n. sp.*

Male and female, 25 mm. Head, thorax, palpi, and antennæ ashy-fuscous. Legs dark-fuscous, posterior pair and all tibiæ light ochreous-yellow. Abdomen ochreous. Forewings elongate, moderate, posteriorly dilated, especially in male; costa rather

strongly arched, apex rounded, hindmargin rounded oblique; fuscous, strewn with darker fuscous and whitish scales; markings blackish; a suffused mark near base forming an indistinct fascia; a thick streak along costa from base to beyond middle, posteriorly attenuated; a dot in disc at one-third, another immediately below it; an elongate spot midway but slightly beyond these; two spots immediately above this; an indistinct crescentic series of three spots immediately below apex of costal streak; a streak from costa at about three-fourths to anal angle, indented below costa; a hindmarginal series of dots, apical portion more elongate; cilia fuscous, at base yellow with a distinct darker median line. Hindwings and cilia ochreous, more or less fuscous-tinged. In the female the markings are almost obliterated through the density of the ground-colour, and the hindwings are darker.

This species is usually found at rest on trunks of *Eucalyptus*, and are consequently difficult to perceive on account of their colour. Two specimens were taken at light, Parkside, in September; and eight specimens in October.

Philobota platyptera, *n. sp.*

Male, 36 mm. Head, thorax, and palpi slaty-grey. Abdomen grey-whitish, posterior segments dull-orange. Antennæ whitish-ochreous. Legs fuscous, posterior pair ochreous-whitish. Forewings elongate ovate, moderate, broad; costa gently arched, apex rounded, hindmargin obliquely rounded; slaty-grey, extreme costal edge blackish; a broad white costal streak from base to near apex, attenuated posteriorly, margined beneath throughout by a dark slaty-grey shade, more pronounced anteriorly where it becomes blackish; cilia greyish, terminal-half lighter. Hindwings ochreous-grey whitish; cilia grey.

One fine specimen beaten from *Styphelia Sonderi* at Teatree Gully, S.A., 1st September. The largest of the genus, and very distinct from any other species.

Philobota Idæ, *n. sp.*

Male and female, 22-24 mm. Head and thorax orange, thorax with an anterior light-fuscous spot. Palpi ochreous-whitish, externally infuscated, except at base. Antennæ fuscous. Abdomen and legs pale yellowish-ochreous, anterior and middle pair infuscated. Forewings elongate, costa slightly arched, apex round-pointed, hindmargin oblique; shining snow-white, with brownish markings; a thick streak from base to costa at three-fourths, thence continued along costa to apex, leaving costal edge for its own width white; extreme costal edge fuscous; lower edge of

brown streak emitting two large teeth, one before one-half, and one at about two-thirds, larger and strongly curved inwards; an irregular streak from base of subcostal streak to anal angle, upper edge with two projections, first almost touching first tooth of subcostal streak, second near anal angle; a streak along inner margin, with a projection upwards near middle, from base and joining median streak at second tooth; an elongate wedge-shaped spot from anal angle reaching about three-fourths across wing; anterior edge suffused, posterior sharply defined; a suffused hindmarginal line, anteriorly suffusedly edged with a streak of orange; a nearly straight orange streak from base to anal angle, cut in middle and at base by the median biangulated line; cilia dark-fuscous, tips paler, with a snow-white tooth at apex. Hindwings fuscous, apex ochreous-tinged; cilia pale-greyish, ochreous-tinged round apex.

Five specimens, taken at Blackwood by my sister, to whom I have dedicated it. A remarkably distinct and beautiful species, most allied to *iosema*, Meyr.

PHILOBOTA PORPHRYXANTHA, *n. sp.*

Male, 22 mm. Head yellow, palpi yellowish, thorax purplish-fuscous, yellow posteriorly, and with a yellow spot on each shoulder. Antennæ, abdomen, and legs dark-fuscous, posterior legs yellowish. Forewings elongate, costa gently arched, apex pointed, hindmargin very obliquely rounded; bright yellow; markings purplish-black; a moderate fascia at base, apex continued narrowly along to about one-third, posteriorly attenuated; a thick streak proceeding from submedian fold before middle to costa beyond middle, and continued along it to apex, posteriorly attenuated; from middle of lower portion of this streak proceeds a somewhat thicker streak direct to anal angle; a moderate streak along hindmargin from anal angle to apex, dilated above; cilia dark-fuscous, base yellowish-tinged. Hindwings dark-fuscous; cilia as in forewings, but more yellowish round anal angle.

Stawell, Victoria; ten specimens. Nearest *ophiodes*, Mey., and the preceding species, but differs in position of markings and shape of wing.

CŒSYRA PORPHYRYPLACA, *n. sp.*

Male, 17 mm. Head and palpi orange-yellow, legs and antennæ dark-fuscous, posterior pair yellowish. All tibiæ and tarsi ringed with yellowish, thorax purplish-fuscous, abdomen fuscous, anal tuft orange. Forewings elongate, costa slightly arched, apex somewhat pointed, hindmargin obliquely rounded; orange; a narrow oblique black fascia at base; a large reddish-

purplish patch, nearly occupying posterior half of wing, anteriorly edged with darker, from three-fifths costa to beyond middle of inner margin, strongly curved; cilia orange, on anal angle fuscous-tinged. Hindwings and cilia ochreous-fuscous.

Port Lincoln, S.A.; one specimen. Perhaps a variety of *dichroëlla*, Zell., but the form of fascia is quite different, and wing more rounded.

MACROBATHRA PARACENTRA, *n. sp.*

Female, 17 mm. Head, palpi, and thorax yellowish-ochreous, terminal joint of palpi externally fuscous, thorax with a purplish quadrate anterior spot. Antennæ fuscous, annulated with yellow, abdomen and legs dark-fuscous, posterior pair yellow. Forewings elongate lanceolate; ochreous yellow; extreme base of costa dark-fuscous; a curved brownish-purple, on lower-half black, anterior edge of fascia from two-thirds costa to one-half inner margin, posterior from two-thirds costa to anal angle; a purplish-fuscous hindmarginal patch indented in middle anteriorly; cilia yellow, at anal angle fuscous. Hindwings and cilia fuscous.

Immediately recognisable by absence of first fascia. One specimen, Gisborne, Victoria (G. Lyell, jr.).

MACROBATHRA ISOSCELANA, *n. sp.*

Female, 19 mm. Head, thorax, and antennæ dark fuscous, antennæ slightly annulated, palpi fuscous, internally edged with whitish, tip of terminal joint whitish. Abdomen greyish, anal tuft yellowish. Legs fuscous, tibiæ and tarsi ringed with white, posterior pair ochreous-fuscous. Forewings elongate, lanceolate; dark purplish-fuscous; a conspicuous yellow triangular spot on costa at three-fourths; cilia fuscous, tips paler, at anal angle greyish. Hindwings greyish-fuscous; cilia greyish-fuscous, tips paler.

One specimen, Blackwood, 25th October. A neat and easily recognised species; in the neighbourhood of *M. porphyrea*, Meyr.

GLYPHIPTERYGIDÆ.

GLYPHIPTERYX LYELLIANA, *n. sp.*

Male and female, 15-16 mm. Head, thorax, antennæ, and abdomen blackish-fuscous, anal tuft yellowish. Collar broadly dark-ochreous. Palpi golden-ochreous, apex of terminal joint blackish. Legs blackish-fuscous, apex of tarsi obscurely ringed with whitish. Forewings moderate, costa gently arched, apex round-pointed, hindmargin rounded, rather oblique; dark golden-ochreous, with brassy-metallic markings, well-defined and irregularly margined with black scales; a curved line from middle of

base to inner margin before middle, but not quite reaching it ; a curved, anteriorly produced fascia from one-fourth of costa to one-third of disc, reaching half-across wing ; a slightly curved fascia from middle of costa to middle of inner margin, contracted in centre ; a strongly curved streak from two-thirds of costa to about middle of disk ; a streak from apex to immediately above anal angle, near and parallel to hindmargin, apical portion whitish, and produced along costa posteriorly ; midway between last two streaks is an elongate spot ; an irregular triangular patch above anal angle, at the upper extremity of which are two very distinct black dots, one on each side ; cilia grey-whitish, with a blackish basal line. Hindwings dark-fuscous ; cilia light-fuscous, with a whitish basal line.

Two specimens from Mr. G. Lyell, junr., of Gisborne, Victoria, an esteemed correspondent, to whom I have dedicated the species. It is immediately recognisable by the black spots above anal angle.

GLYPHIPTERYX PLATYDISEMA, *n. sp.*

Male and female, 8-10 mm. Head, antennæ, thorax, palpi, and abdomen dark-fuscous, palpi with three rings of whitish scales, segments of abdomen and anal-tuft whitish, legs blackish, tarsi and tibia broadly-banded with white. Forewings moderate, slightly dilated posteriorly, apex pointed, hindmargin sinuate beneath apex ; blackish-fuscous, somewhat purple shining ; a broad, straight, whitish fascia from one-sixth costa to one-sixth inner margin, posterior edge with a slight concavity above middle ; a similar, almost parallel, fascia from two-fifths costa to about middle of inner margin, slightly attenuated on costa ; a violet metallic line from beyond middle of costa to anal angle, slightly angulated outwards in middle ; three short whitish fascia from costa between this and apex, lower portion violet metallic, the first longest, reaching half-way across wing ; some golden-metallic scales along hindmargin at anal angle and towards apex ; cilia blackish, terminal one-half white, with a blackish tooth at apex, and a whitish indentation at about middle of hindmargin. Hindwings and cilia dark-fuscous.

Allied to *G. meteora*, Meyr., but distinct by the two anterior fascia going right across wing, and other points. Four specimens, bred by Mr. G. Lyell, Jun., of Gisborne, Victoria ; larvæ feed in stems of rushes.

GLYPHIPTERYX HALIMOPHILA, *n. sp.*

Male and female, 7-9 mm. Head and thorax shining-bronzy-fuscous, thorax with a longitudinal white stripe on each side. Palpi fuscous, with black rings, whorl of hairs whitish. Antennæ blackish. Abdomen shining-bronzy-fuscous. Legs dark-fuscous,

tarsi with whitish apical rings, posterior tibiæ with whitish central and apical rings. Forewings moderate, slightly dilated, shining-ochreous-bronze; markings white, margined with black, a longitudinal streak from base to two-thirds, separated from inner margin by its own width of ground-colour; an oblique streak from costa before middle, reaching about half-across wing; a similar streak hardly beyond middle, and a streak from anal angle, extremities meeting, latter portion metallic-purple; a streak from two-thirds of costa to anal angle, lower two-thirds purplish-metallic; a triangular tooth immediately before apex containing two wedge-shaped streaks of ground-colour, broader beneath; a round black spot immediately below apex, its lower edge containing a few purple-metallic scales; a patch of purple-metallic scales near anal angle, almost confluent with third costal streak; cilia dark-fuscous, tips white; a white tooth immediately below apex, and another below the round black spot. Hindwings fuscous; cilia fuscous, paler towards base.

Common at Glenelg, S.A., in September, frequenting *Lepidosperma gladiatum*. In markings allied to *Phrygonostola euthybelemna*, Meyrick, but differs in position and breadth of markings, besides being a smaller insect.

DEPRESSARIDÆ.

Pachycera catoryctopsis, *n. sp.*

Male and female, 23-27. Head and antennæ white, antennæ beneath annulated with fuscous, palpi, thorax and legs ashy-grey-whitish, hairs of posterior legs yellowish-tinged, abdomen grey. Forewings moderate, costa gently arched, hindmargin obliquely rounded; fuscous, suffusedly mixed with whitish; a white streak along costa from base to beyond middle, attenuated posteriorly and continued to near apex, the anterior portion containing a fine grey line, lower portion edged with a fine black line; an elongate white mark in middle of wing, outlined with black; a thick white streak from base along fold, suffusedly continued to near anal angle, partially edged below with a fine black line; all veins towards hindmargin sharply defined by black lines, interspaces filled with white; a hindmarginal row of black dots; cilia ashy-grey-whitish, tips darker. Hindwings grey; cilia white, with a darker line.

Highbury and Blackwood in March; four specimens. Resembles greatly *Catoryctis tricrena*, Meyr., one of the Xyloryctidæ.

ELACHISTIDÆ.

Stathmopoda callichrysa, *n. sp.*

Female, 12 mm. Head and palpi ochreous-yellow, thorax

purplish-fuscous, abdomen dark-fuscous, anal tuft yellowish. Legs and antennæ fuscous. Forewings elongate, apex pointed bright golden-yellow; a purplish fuscous basal patch, hardly as wide as wing; a similar patch occupying apical one-half of wing, and a narrow line along costa connecting the two; cilia golden-brown. Hindwings and cilia golden-brown.

One specimen bred from Wattle-gall (species of *Acacia* unknown), by Mr. J. A. Kershaw, of Melbourne, Victoria, November 24, 1892.

On the Poisonous Constituents of Stephania hernandifolia.

By Professor Edward H. Rennie, M.A., D.Sc., and E. F. Turner.

[Read June 6, 1893.]

Some considerable time ago, Dr. Thomas L. Bancroft, of Brisbane, forwarded to us for examination a quantity of the roots of *Stephania hernandifolia*, Walpers. He had found that an extract of the roots was exceedingly poisonous to frogs, and published an account of his experiments in vol. IV. (series 2nd) of the Proceedings of the Linnæan Society of New South Wales (27th November, 1889.) He pointed out that the physiological action of the active substance appeared to be identical with that of *picrotoxin*, the active principle of *Cocculus*, a genus of the same order as *Stephania*, but having failed to obtain picrotoxin from the plant, he suspected the poisonous effects to be due to an alkaloid.

In order to isolate the active substances, the following method was adopted :—The roots cut up into fragments were exhausted with boiling alcohol, the alcohol distilled off, the residue extracted repeatedly with boiling water, and the solution filtered. While still warm basic lead acetate was added, and the liquid filtered again through linen. The excess of lead was then precipitated by dilute sulphuric acid, and the acid liquid, after filtration, extracted with chloroform. The chloroform having been distilled off, the residue, which was crystalline, was repeatedly recrystallised from boiling water till colourless and apparently pure. Various samples of the substance thus prepared melted at temperatures varying from 193° C. to 197° C. The substance so obtained closely resembled picrotoxin in external characters, and was intensely bitter. The melting point of picrotoxin is variously given as from 199° to 201° C. Authorities differ as to its exact composition, and it is apparently very liable to decomposition and change. According to the latest and most authoritative statements there are two substances, much alike, and both very bitter and poisonous, called *picrotoxin* and *picrotoxinin*, the latter arising from the decomposition of the former, the formulæ ascribed to these substances being respectively $C_{30}H_{34}O_{13}$ and $C_{15}H_{16}O_6$

The substance obtained by us gave the following results on combustion :—

Substance taken.	CO_2.	H_2O.
·2128	·4756	·126
·2124	·4710	·1107

Calculated for $C_{30}H_{34}O_{13}$.	Calculated for $C_{15}H_{16}O_6$.	Found I.	Found II.
C 59·80	61·64	60·95	60·52
H 5·64	5·47	6·50	5·79
O 34·56	32·89	—	—
100·00	100·00		

A sample of picrotoxin purchased some time ago was subjected to various modes of treatment, being recrystallised in different ways, and gave the following percentage of carbon and hydrogen :—

Carbon ...	60·66	61·06	60·10	61·90	60·79
Hydrogen...	—	6·31	5·78	6·20	5·91

It will be seen that the figures obtained by us for the substance from *Stephania* come well within the limits of those obtained from different samples of genuine picrotoxin. We have no doubt whatever, therefore, that the crystalline substance obtained as above described from *Stephania*-roots is picrotoxin, or a mixture of picrotoxin and picrotoxinin. Dr. Stirling kindly injected some of the aqueous solution into the dorsal lymph sac of a frog. Violent convulsions speedily set in, resulting in death—a result quite in accordance with the known physiological effects of picrotoxin.

There was, however, reason to suspect that some other poisonous matter was present in the roots besides that just described. The acid liquid, therefore, from which the picrotoxin had been thoroughly extracted by chloroform, was made alkaline with caustic soda. This caused the precipitation of a substance which, however, dissolved in excess of soda, but was partially reprecipitated on the addition of sodium bicarbonate. The precipitate was filtered off, and the alkaline solution extracted with ether. The ether, on evaporation, left a yellow amorphous mass which gave all the characteristic reactions of an alkaloid ; but from which no crystalline salts could be obtained. Its chief chemical characteristic was the brilliant green colouration which it gave on the addition of strong sulphuric acid. We at first suspected the presence of *berberine*, but all efforts to isolate this alkaloid have so far failed. The yellow alkaloid was not obtained in sufficient quantity for analysis. It is very easily decomposed ; for instance, if dissolved in dilute acetic acid and evaporated on

the water bath or even *in vacuo*, the residue is darker in colour, and partly insoluble in water, but if the solution be made alkaline and again extracted with ether, the yellow residue is again obtained on evaporation. A solution of this substance is intensely poisonous, but possesses physiological properties very different from those of picrotoxin. Injected into the dorsal lymph-sac of a frog in a large dose it produced complete paralysis and speedy death *without convulsions.*

No definite satisfactory results could be obtained with the substance referred to above, as partially precipitated from the caustic soda solution or addition of sodium bicarbonate; but it appeared to possess poisonous properties.

We forwarded a small quantity of the solution of the yellow alkaloid to Dr. Bancroft, who sent us the following account of its effects:—"This substance was intensely poisonous, and produced death in a frog in quite a different manner from the 'Stephania' extract, or from picrotoxin. There was excessive vomiting at first, then extreme irritability, so that the slightest touch produced exaggerated movements. The reflex excitability of the spinal chord was increased quite as much, or more perhaps, than by strychnine, yet there were no tetanic convulsions produced. Nevertheless there were what might be termed moderate convulsions. I suppose if the dose were very great death would occur without convulsions, yet it would be hardly right to say there were no convulsions, if less then a lethal dose be given. There are some remarkable phenomena connected with the respiration, leading one to think the substance was a respirating stimulant. It seems to have no bad effect on the heart."

Perhaps in the future we may be able to do more towards the investigation of these substances, but at present the material is exhausted and time is wanting.

On Some New Species of Australian Marine Gastropoda.

By Professor Ralph Tate.

Plate I.

[Read June 6, 1893.]

Sipho (?) mimeticus, *spec. nov.* Pl. i., fig. 10.

Shell pyriform, imperforate, uniformly sordid-white, whorls four and a-half, suture distinct but not canaliculate; embryo of one and a-half turns, naticiform, smooth; first spire-whorl and anterior-half of second angulated medially; the rest angulated over the suture, flatly-convex behind, with five revolving threads at the posterior suture a double thread which is slightly crenulated by oblique slender costæ fading-off anteriorly into threads.

Body-whorl ventricose in front of the periphery, periphery ornamented with subacute nodulose crenatures (about twelve), posterior area slightly concave with five raised threads finely and closely elevate-striated in the intervals, at the suture a thickened lira which is slightly crenulated; anterior part of body-whorl with raised threads, which are more or less equal and equidistant.

Aperture rhomboid-oval; outer lip smooth within; columella covered with a thin callus, regularly concave; the base is gradually contracted into a moderately-elongated snout, nearly as long as the aperture, bent to the left and slightly upturned.

Dimensions.—Total length, 15·5; greatest diameter, 8·5; length of aperture, 12; width of aperture, 4.

Habitat.—Dredged by Mr. E. H. Matthews, on December 31, 1888, from a sandy bottom on Tapley's Shoal, about eight miles off Edithburgh, in 12 to 16 fathoms (one dead specimen).

Affinity.—This shell is probably immature and its generic location is uncertain. It has a general resemblance to *Fulgur canaliculatus*, Linn., from the young of which it is separable by its more ventricose body-whorl, shorter and more tortuous snout, and generically by the absence of a columella-fold. It bears a resemblance to some species of *Sycum*, though the form of the embryo and the smooth test in that genus prohibit its attachment thereto. It is also like *Streptosiphon porphyrostoma*, which has, however, an oblique double fold on the columella.

Taking separately the conchological characters of this shell

not one of them will exclude it from *Sipho*, though the facies is not proper to this genus; here I tentatively place it, awaiting fuller material to determine its proper classificatory position.

Columbella (Mitrella) vincta, *spec. nov.* Pl. i., fig. 11.

Shell small, narrowly oval, shining light-horn (dead shells white) with a *revolving red or brown band* next to the anterior suture. Nuclear whorls one and a-half, smooth, globose, with a small blunt tip. Spire-whorls five, very slightly convex (abruptly but feebly so at the posterior suture). Aperture oval, outer lip 7-dentate within.

Dimensions.—Height, 9·5 to 10; diameter, 4·25.

Localities.—Fowler and Streaky Bays, Middleton, and Cape Northumberland, S. Australia; also north coast of Tasmania.

This species in respect of coloration is readily recognised by its brown band, which though of variable width is always margined with white at the posterior suture; the band is usually uninterrupted, but is occasionally scalloped at its posterior margin, or at both margins on the body-whorl. In shape and size it is near *C. dictua*, Ten.-Woods, but is narrower, and the whorls are not so flat; also near *C. lineolata*, Pease, but is much narrower. The proportion of height to width is, in *C. vincta*, 100 to 45 and 42·5; in *C. dictua*, 100 to 47.

Cerithiopsis marmorata, *spec. nov.*

Shell elongately acuminated, *marbled* with white and brown, encircled by rounded cinguli and axially striated in the intervals. On the posterior whorls there are four cinguli; five on the penultimate; five on the body-whorl posterior to the periphery, with or without a slender one interposed between the first and second from the suture; the base with one cingulus in front of the periphery.

Dimensions.—Height, 15 (estimated); width, 3·25.

Localities.—Head of Great Australian Bight, Streaky and Fowler Bays, St. Vincent Gulf, Middleton, Cape Northumberland.

Affinity.—This species is more elender than *C. crocea*, and stouter than *C. purpurea*, but with a distinctive coloration. In ornament it approximates to *C. crocea*, but appears to have more cinguli on the body-whorl.

Bittium estuarinum, *spec. nov.* Pl. v., fig. 12.

B. pyramidale,* Tate, m.s.

* As the name *pyramidale* is already occupied in some closely-related genera, *e.g.*, *Potamides* and *Cerithium*, I have thought it safer to select that of *estuarinum*, which is not in use for any species of the Family Cerithiidæ, and thus avoid the possibility of duplication.

Shell elongate, stoutish; apex acute; whorls about twelve, convex, the uppermost whorls angulated medially, covered with a bluish-black to grey epidermis beneath which the colour is reddish; suture distinct. Base convex. Aperture circular, slightly angulated and effuse at the base of the columella; shining-black within; outer lip thin and arcuate; columella arched, obliquely excavated so as to form a slightly-raised border exteriorly. Operculum circular and multispiral.

Ornament consisting of depressed spiral threads, five or six on the penultimate whorl, and of slightly-arched plicæ (from eleven to fifteen on penultimate whorl) which terminate abruptly at the second lira from the anterior suture; the liræ as they pass over the plicæ produce nodular crenatures; the whole surface is sculptured with fine arcuate striæ. The plicæ vary much in strength, rarely obsolete; in the latter case the shell approximates to *B. Lawleyanum*, from which it is conspicuously distinguished by its elongate form, less dense, and more thread-like spiral ornament. The base is concentrically ridged and transversely striated.

Dimensions.—Of a large specimen, length 22, major diameter of base, 5; of a medium-sized specimen, length 17, major diameter of body-whorl, 4·5. The proportion of length to the basal diameter varies from 100 to 22·5 to 100 to 33; but the extremely-broad forms are rare.

Habitat.—Living on the mud, between tide-marks, Port Adelaide Creek; Franklin Harbour; in shallow water on *Zosteræ* in Lake MacDonald, West Coast.

Affinity.—The plicate ornament without distinctive granulation reduces the comparison of this species to a very few congeners; but the non-plicate supra-sutural area, the number of the spiral liræ and the elongate form separate it from all of them.

Torinia foveolata, *spec. nov.* Pl. i., fig. 13-13a.

Shell small, depressed, slightly convex, semitransparent-white; whorls of rather slow increase, four, separated by an impressed suture, but not conspicuously channelled. Last whorl angulated at the periphery; base rounded, profundly and widely umbilicated. Aperture quadrately rounded.

Ornament of penultimate whorl consisting of four spiral riblets (of which one in the anterior-third is the strongest), and slightly-oblique transverse threads (nearly as stout as the largest of the spirals); the intersection of the spiral and transverse threads produce rhombic pits, within which are a few spiral striæ; the largest spiral riblet is delicately granulated at the intersections with the transverse threads. The body-whorl has a gemmulated keel, the medial portion of the upper surface has two

gemmulated ribs of about equal magnitude, at the suture there is a double smaller rib, and there is a finer one posterior to the periphery. The transverse riblets of the penultimate whorl with increasing revolution of the whorls become more slender and closer together, and thus the fenestrated ornament is somewhat obscured on the front part of the body-whorl. Below the periphery there are about five revolving equal-sized ribs, more or less gemmulated at the intersections of transverse sigmoidal threads, the one margining the umbilicus most conspicuously so. The umbilical wall has about five flat threads crossed by lamella-like striæ.

Dimensions.—Height, 1·75; basal diameters, 4·25; and 5 *(vix)*; major diameter of umbilicus, 2·5 *(vix)*.

Localities.—Three dead shells, Aldinga Bay and Semaphore.

Affinity.—The conspicuous oblique ribbing and very wide umbilicus are characters which separate this species from the majority of its congeners. Its near allies are *T. aspera* and *T. fenestrata*, but it is flatter than the former, and more angulated than the latter; unacquainted with either, except by Tryon's figures and descriptions, a critical comparison is not possible.

Turbo (Astralium) rutidoloma,* *spec. nov.* Pl. i., fig. 9.

Shell lenticular-conoid, about equally sloping above and below from the angular periphery; whorls four and a-half, flat, the embryonic one and a-half whorls fimbriated at the suture; umbilicus minute. Operculum as in *T. aureus*.

Upper-surface of body-whorl with a stout and a broad lira next the suture, which is transversely crenulate-ridged; periphery bluntly angled by a slightly compressed convex keel, which is obsoletely crenulated; between the keel and the sutural band are three granulose liræ about equidistant and equal-sized but the anterior one is close to the keel (in senile specimens a small lira is interposed next the suture, and there is a tendency in the granules of the liræ to become somewhat confluent); the intervals between the liræ are smooth. The base has four granulose liræ; the umbilical region is bounded by a broad ridge, which is broken-up into claviform tubercles obliquely disposed.

Colour greenish-brown in living specimens, flesh-coloured with rufous liræ and darker-tinted at the suture and keel in beach-examples. The interior of the aperture of living examples is greenish and of a pearly lustre.

Dimensions.—Height, 7·5; basal diameters, 10·5 and 12.

Localities.—At low tides, Moonta Bay *(Messrs. Maughan* and *McDougall)*; in eight fathoms, Hardwicke Bay *(Dr. Verco)*.

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* In allusion to the wrinkled border at the anterior suture.

Affinity.—This species has a general resemblance to *Astralium aureum*, but is more depressed, umbilicated, and has a different ornamentation and coloration.

Clanculus consobrinus, *spec. nov.* Pl. i., figs. 1, 1a.

Shell perforate, depressed, pinkish-brown, sparsely black-dotted. Spire low-conic, apex acute ; whorls five, suture subcanaliculate ; body-whorl obtusely bi-angular at the periphery, base somewhat convex. Aperture rounded, oblique ; outer and basal margins lirate-dentate. Columella oblique, neither tortuous above nor entering the umbilicus; its front edge plain, except a tooth at the base. Umbilicus wide and deep, its margin crenate-dentate.

Ornament of penultimate whorl of four equal and equidistant granulose liræ, and obliquely-transverse raised threads ; of the body-whorl, a small granulose lira interposed between the third and fourth, anterior to the fourth are two smaller equally-distant from one another, the fifth is slightly granulose, whilst the sixth, which is at the periphery, is broad and obtuse ; the interspaces between the liræ are faintly spirally striate ; base with seven concentric liræ, the inner ones subgranose, the outer ones plain, with a few coincident striæ in the interspaces.

Dimensions.—Height, 8 ; basal diameters, 14 and 12 mm.

Localities.—Cast-up : Holdfast and Aldinga Bays, S. Yorke Peninsula ; Head of Great Australian Bight (several examples). Dead shells dredged in Yankilla Bay, Backstairs Passage, and Corney Point in 30 fathoms *(Dr. Verco).*

Affinity.—This species has the form of *C. plebeius*, but I cannot attach it to any of its recognisable varieties or to any described congener. It is slightly more depressed than *C. plebeius*, whilst it attains nearly twice the size ; the umbilicus is deeper, reaching to or beyond the junction of the penultimate and last whorls. The absence of the trenchant tessellated sculpture and the equidistant granular liræ of the posterior area of the body-whorls are distinctive characters, which are furnished by the ornament.

Clanculus euchelioides, *spec. nov.* Pl. i., fig. 8.

Shell turbinately concoid, somewhat solid, opaque, concolorous (reddish); whorls about six, the ordinary spire-whorls separated by a canaliculate suture and flattened posteriorly, the last whorl convex in the anterior-third ; base flatly convex, falsely umbilicated, the columella entering the umbilical depression, which is shallow and moderately narrow. Aperture oblique, rhomboid-oval ; outer lip slightly depressed at the suture ; outer and basal margins thin, lirate, and iridescent within (the liræ not extending to the margin). Columella oblique, straight, rib-like, with an attenuated keel elevated into a tooth-like prominence at the base, and separated from the basal margin of the aperture by a deep

notch. (Immature shells are without the columella-characters). Operculum multispiral.

Ornament of early spire-whorls consisting of three plain cinguli, the posterior one smaller than the others ; of penultimate whorl with a riblet between anterior suture and first cingulus, between first and second, and second and third cinguli ; of last whorl with seven cinguli on the upper-surface and interposed riblet here and there, base with seven cinguli, with an interposed riblet in the one or two exterior sulci; there is no conspicuous rib margining the umbilical area. The whole surface of the shell (except apical whorls) is sculptured with fine close oblique striæ, which pass over the principal cinguli, which occasionally show a tendency to granulation.

Dimensions of a large specimen :—Height, 6·25 ; basal diameters, 5·75 and 6·5.

Localities.—Living at low tide-mark, under stones, Moonta Bay *(MM. Maughan* and *McDougall);* off Rapid Bay Head, in 10 to 12 fms. ; off Corney Point, in 30 fms., and off Rickaby *(Dr. Verco).*

This Euchelus-like shell, which has been known to me for several years, I had thought might be immature ; but it is only recently that I have had the opportunity of studying a large suite of specimens, which permits me to alter my opinion. The simplicity of the apertural and umbilical characters combined with those afforded by the ornamentation are such as to render unnecessary a comparison with other species of the genus.

Thalotia neglecta, *spec. nov.* Pl. i., fig. 6.

I separate under the above name a shell, which has been confounded with *T. chlorostoma* with which it agrees in its arcuate and truncated columella, but is without the acutely-carinated periphery, and thus establishes a passage from *Thalotia* to the section *Odontotrochus*, though it has more of the facies of the latter than the former.

The columella, as in *T. chlorostoma*, is sharply defined by a coincident umbilical depression. The species differs by the absence of the supra-sutural carina, its slightly convex whorls, and less elevated spire.

The whorls, eight in number, have the spiral and transverse ornament, as in *T. chlorostoma.* The colour is usually brown or yellowish, spotted with white or brown-white blotches, and more or less with white and brown above the suture and on the periphery, rarely unicolorous (greenish-yellow).

Adult specimens, as shown by the thickened outer lip bevelled to a sharp edge, have been dredged in life on Troubridge Shoal, St. Vincent Gulf, in six fathoms, by Mr. Matthews. Taken abundantly, living and dead, in St. Vincent and Spencer Gulfs at various depths from 5 to 15 fathoms *(Dr. Verco).*

Dimensions.—Height, 18; basal diameters, 13·5 and 15.

A single specimen of what may prove to be a distinct species allied to *T. chlorostoma*, taken at Geographe Bay, W. Australia, is of a buff colour, except the red-tinged apical whorls, the oblique striæ are obsolete, and the revolving liræ are replaced by linear sulci.

Calliostoma spinulosum, *spec. nov.* Pl. i., fig. 7.

Shell small, imperforate, broadly conical, pale reddish-yellow with small white blotches; whorls six and a-half, slightly imbricating; base almost flat.

Ornament of penultimate whorl consisting of three spiral liræ crossed by equal-sized, stout, slightly obtuse, oblique ridges; the interstitial pits deep, rhombic, smooth; the points of intersection of the spirals and oblique costæ are produced into spiniform granules. The liræ diminish in size from the anterior to the posterior suture; the oblique ridges being as stout as the median spiral. The spiral ridges on the body-whorl are increased by a slender lira interposed between the first and the second, and by a subperipheral lira nearly equal in size to the peripheral one, the two together forming a truncated sulcated keel. Base with about six concentric liræ, somewhat depressed, subacute, and showing a tendency to subgranulose, crossed by strong radial growth-lines.

Dimensions.—Height, 5; basal diameters, 4 and 4·5.

Locality.—Moonta Bay; one living example received from the late Mr. McDougall.

Affinity.—This exquisite little shell is readily distinguished from all congeners, except *C. rubropunctatum*, A. Adams, by its clathrate and echinate ornament; from that species it would seem to differ by its subimbricating whorls and fewer liræ.

Euchelus fenestratus, *spec. nov.* Pl. i., fig. 2.

Shell imperforate, oval-conic, solid, thick; spire conical, whorls four and a-half, suture canaliculate by reason of the approximation of the infra- and supra-sutural liræ. Aperture rounded, oblique; outer margin lirate, basal margin tuberculate. Columella concave, its margin sharp and nearly straight, furnished with a sharp tooth at the base succeeded by a deep basal notch; the first tubercle on the basal margin is equal in size to the columellar denticle.

Ornament of strong spiral ribs decussated by less elevated oblique ribs, which cut the interstices into rhombic pits; at the intersections the spiral ribs are subnodulose. On the penultimate whorl there are three liræ, the posterior one of which is much smaller than the others; the latter by their prominence give the whorl a biangulate section. The body-whorl, the convexity of which is only slightly interrupted, has six liræ, of the three in

front of the periphery the posterior one is nearly as prominent as the peripheral one.

Colour white, with spots of reddish-brown on the liræ, grouped in nearly axial lines across the anterior-half of the penultimate whorl, and across the body-whorl to its base.

Dimensions.—Height, 4; diameter, 3·25.

Habitat.—West Australia, exact locality not known. (Three examples in my collection.)

Affinities.—In its clathrate ornament, elevated spire, and biangulated whorls, this new species resembles *E. angulatus*, Pease, *E. pauperculus*, Lischke, *E. scrobiculatus*, Souverbie, but differs from them *inter alia* by its unidentate columella. *E. instrictus*, Gould, may perhaps approach nearer, but the Australian shell has fewer liræ, and the transverse ornament is closer and finer; and though the mouth-aperture is similar, yet the Polynesian shell is deeply umbilicate.

Euchelus pumilio, *spec. nov.* Pl. i., fig. 3.

The shells to which I give this name are closely related to those of the foregoing species, *E. fenestratus*, they differ by their more rapidly-increasing whorls, in having two stout liræ on the penultimate-whorl, five on the body-whorl, the stouter and more distant transverse riblets which, moreover, are less oblique or nearly axial in direction, and by the feebler nodosities on the liræ. The colour-spots are usually confluent on the axial riblets.

Dimensions.—Height, 3; diameter, 3·25.

Localities.—Fowler Bay and Head of Great Australian Bight. (Six examples in my collection.)

Euchelus vixumbilicatus, *spec. nov.* Pl. i., fig. 4.

Shell similar to *E. scabriusculus*, but relatively broader and the whorls more convex. The penultimate whorl has four narrow subequal and equidistant cinguli latticed by nearly equally thick oblique costæ, which produce slight granulations on the cinguli and divide-up the surface into rhombic spaces. This open latticed ornament, though present in *E. scabriusculus*, is almost concealed by the closeness of the thick cinguli, which are densely studded with granules. There are fourteen beaded cinguli on the body-whorl between the beaded umbilical border and the suture. The colour is white, with pink spots; but the shell has not been seen in a fresh state.

Dimensions.—Height, 5·5; basal diameters, 5·5 and 5.

Localities.—West coast of South Australia (many examples); Hardwicke Bay (one example); also West Australia.

Euchelus annectans, *spec. nov.*

This species has the same shape as the preceding, but differs in the following particulars:—The penultimate whorl has five

beaded cinguli fenestrated in the sulci ; the last whorl usually with ten cinguli ; there is no umbilicus and no prominent beaded cingulus bounding the umbilical region.

Dimensions.—Height, 5 *(vix);* basal diameters, 4 and 5.

Habitat.—West Australia ; exact locality not known (six examples).

Euchelus ampullus, *spec. nov.* Pl. i., fig. 5.

Shell globose-conic, imperforate in the young, narrowly umbilicated or reduced to a fissure in the adult ; whitish, spotted with red on the revolving ribs ; spire-whorls quadrate, separated by a linear suture ; last whorl convex, except a little flattening at the suture.

Ornament of penultimate whorl consisting of three equally thick, obtuse, and plain cinguli, separated from one another and from the sutures by nearly equal interspaces, with or without a small riblet in each interval ; all over regularly clathrate, the interstitial pits narrowly oblong. Last whorl with about eight cinguli, clathrate in the intervals : the supra-peripheral intervals with a riblet ; the four basal cinguli granulose.

Aperture roundly oval, outer and basal margins smooth within ; columella arcuate, slightly explanulate concave, edentulous.

Dimensions.—Height, 11·5 ; basal diameters, 9·25 and 11·5.

Locality.—Probably Cambridge Gulf, N.W. Australia (several examples).

Affinity.—This species will fall into Pilsbry's Section Hybochelus. Of the four described species *E. Delpreti* is the only one with the basal diameter equal to the height ; in the others the proportion of the height to the diameter is 100 to 120–130. *E. fossulatus* has four principal liræ on the penultimate whorl. *E. mysticus* is imperforate. In *E. cancellatus* and *E. Delpreti* the number of the basal cinguli is greater than in the present species, the latter having two cinguli on the penultimate whorl.

EXPLANATIONS TO PLATE I.

Fig. 1-1*a*. Clanculus consobrinus, *Tate*. 2 x.
" 2. Euchelus fenestratus, *Tate*. 5 x.
" 3. Euchelus pumilio, *Tate*. 2 x.
" 4. Euchelus vixumbilicatus, *Tate*. 3 x.
" 5. Euchelus ampullus, *Tate*. 1·5 x.
" 6. Thalotia neglecta, *Tate*. 1·5 x.
" 7. Calliostoma spinulosum, *Tate*. 3 x and magnified ornament.
" 8-8*a*. Clanculus euchelioides, *Tate*. 3 x (vix).
" 9. Turbo rutidoloma, *Tate*. 1·5 x.
" 10. Sipho (?) mimeticus, *Tate*. 2 x.
" 11. Columbella (Mitrella) vincta, *Tate*. 2 x.
" 12. Bittium estuarinum, *Tate*. Nat. size, and magnified ornament.
" 13-13*a*. Torinia foveolata, *Tate*. 3 x.

Some Additions to the List of the Marine Gastropoda of South Australia.

By Professor Ralph Tate.

[Read June 6, 1893.]

In the recently published "Hand List of the Aquatic Mollusca inhabiting South Australia," Mr. Adcock, the compiler, has made me responsible for some specific names which are in reality only manuscript ones. In the foregoing paper I have established the major part of those names by appropriate diagnoses and figures.

Whilst the "Hand List" was passing through the press I had not the opportunity of consulting my cabinet, and as a consequence some species escaped notice; and, moreover, in the meanwhile some species have been added to the fauna through the dredging operations conducted by Dr. Verco during January of this year.

Briefly, then, this communication consists of addenda and corrigenda to the "Hand List," and the numerals in brackets prefixed to the species-names are in correspondence with those in that publication.

(3). Murex umbilicatus, *Ten.-Woods.*

Trophon umbilicatus, T.-Wds., Proc. Roy. Soc. Tasmania, for 1875, p. 135 (1870).

This species is distinct from *M. octogonus*, Q. & G., as pointed out by Mr. Brazier, an opinion with which we concur. *M. scalaris*, Adams, is an older name, but as it is preoccupied for a well-known fossil of the Piedmontese Pliocene, Tenison-Woods' name appears in substitution.

Sipho (?) mimeticus, *Tate* (ante p. 189).

(39). Latirofusus nigrofuscus, *Tate.*

Since the publication of my diagnosis and figure of the above-named species, I have examined several private collections of Tasmanian shells in Hobart and Launceston and the local collection in the Hobart Museum. In these I find the names of *Fusus Spiceri* and *F. Legrandi* indiscriminately applied; and I am not sure that I have seen the type of either. But from Woods' description, I do not hesitate to select *F. Spiceri* as the one which is synonymous with my *Latirofusus nigrofuscus*, the other shell I consider to be a young state of *Siphonalia sulcata*. The specimens received from Mr. Legrand, which were said to have

been identified by Tenison-Woods, undoubtedly belong to *L. nigrofuscus*. Had I been aware of this before publication I would have adopted Tenison-Woods' specific name. Now, the question is whether under the circumstances it should have preference. I think not, as the diagnosis, unaccompanied by a figure, is inadequate to define the species; the most important character—the plicated columella—was overlooked, though the apex is described as mammillated, a character of the highest classifactory value in the Family Fusidæ. Had Woods correctly interpreted the columella-characters, he would probably have referred the species to *Fasciolaria*, in which case it might have been recognised by his diagnosis.

(46). Cantharus rubiginosus, *Reeve.*

(74). Mitra rufocincta, *A. Adams.*

This includes (82) *Mitra vincta*, Adams (not Angas).

(83). Mitra Legrandi, *Ten.-Woods.*

(101). Ancillaria Petterdi, *nom. mut.*

A. obtusa, Petterd, Proc. Roy. Soc. Tasm. for 1885, p. 342, (1886), *non* Swainson.

A. obesula, Tate, *non* Deshayes.

(112). Columbella vincta, *Tate* (ante p. 190).

Clathurella Brenchleyi, *Angas.*

Off Corney Point in 17 fathoms, and off Rickaby in six fathoms, Spencer Gulf; Yankalilla Bay in 15 to 20 fathoms and off Rapid Head, St. Vincent Gulf *(Dr. Verco)*. Also Victoria! and N.S. Wales.

(138). Mangilia spurca, *Hinds.*

This includes (141) *Clathurella crassina*, Angas.

(152). Cancellaria purpurinaeformis, *Valc.*

By a clerical error the species name was written *paludinæformis;* (151) *C. laevigata* is probably the same.

Calyptræa pellucida, *Reeve.*

Icon. Conch., Mon., *Trochita*, t. 1., f. 2.

Dredged in life in St. Vincent and Spencer Gulfs by Dr. Verco (many examples). Also New South Wales, N. Australia, S. Papua, Phillipines.

Toreula runcinata, *B. Watson.*

Turritella runcinata, Voy. Challenger, t. 30, fig. 3, p. 475.

South Australian examples of this species agree in all details with Watson's description; but they attain to a length of 44 mm., and diameter of 13 mm.; the fissural notch is triangular

with rounded basal angles and acute apical angle, its height is 4 mm. An individual variation has the anterior carina conspicuously elevated.

Dredged in life, in 15 fathoms, in Backstairs Passage, by Dr. Verco (several examples). The "Challenger" specimens were obtained from 38 to 40 fathoms, off east Moncoeur Island, Bass-strait.

Torinia foveolata, *Tate* (ante p. 191).

(236). Bittium estuarinum, *Tate* (ante p. 190).

(228). Cerithiopsis marmorata, *Tate* (ante p. 190).

Rissoina (Phosinella) horrida, *Garrett.*

R. australis, Sowerby.

Cape Northumberland in shell-sand (one example). Also Queensland and Viti Islands.

(263). Rissoina (Phosinella) toxopleura, *(nom. mut.).*

R. lirata, Angas, *non* Gould (1861).

I have specimens from King George Sound.

Potamopyrgus niger, *Quoy* and *Gaimard.*

Paludina nigra, Voy. Astrolabe, t. 58, figs. 9-12.

An estuarine mollusc inhabitating Port Adelaide Creek, Coffin Bay; also in Tasmania; 267 is, and 268 probably, congeneric.

(299). Phasianella variegata, *Lk.*

I do not consider *P. Angasi* (300) to be specifically distinct.

(307). Astralium rutidoloma, *Tate* (ante p. 192).

(316). Clanculus consobrinus, *Tate* (ante p. 193).

Clanculus euchelioides, *Tate* (ante p. 193).

(432). Thalotia neglecta, *Tate* (ante p. 194).

Calliostoma spinulosum, *Tate* (ante, p. 195).

Calliostoma ciliaris, *Menke.*

Trochus ciliaris, Moll. Nov. Holl., p. 17 (1843); Tryon, Man. Conch., vol. XI., p. 338.

Of this, one of the largest species of the genus, measuring one inch by one and a-quarter, three living examples were dredged in Spencer Gulf by Dr. Verco. Menke records it from the north-west coast of Australia, without any particular locality.

Calliostoma australis, *Broderip.*

Tryon, op. cit., p. 348, t. 18, f. 23.

This species belongs to S.W. coast of W. Australia, but has been dredged off Normanville, St. Vincent Gulf, by Dr. Verco.

(360). Euchelus scabriusculus, *Fischer.*

Trochus scabriusculus, Fischer, Coq. Viv., p. 374, t. 114, f. 2, 1880: *Euchelus (Herpetopoma) scabriusculus*, Pilsbry, Tryon's Man. Conch., vol. XI., p. 445, t. 38, f. 12, 1889; *Euchelus Tasmanicus*, Ten.-Woods, Proc. Roy. Soc. Tasm. for 1875, p. 152 (1876).

There can be no doubt that the shell which is known to the conchologists of N.S. Wales as *E. scabriusculus* is identical with *E. Tasmanicus*. Though I must admit that the figure of it given by Pilsbry, whether original or copied from Fischer is not stated, is not much like Woods' shell, which approaches more to the figure of *E. Fischeri*. *E. Tasmanicus* has the multispiral operculum attributed by Pilsbry to *E. scabriusculus*, which uniquely represents his section *Herpetopoma*.

The question arises as to priority of name. The description given by Tenison-Woods lacks that minuteness which is essential to specific definition; Fischer's diagnosis is much more detailed, and though certain good characters are omitted, yet is worthy of acceptance. The first employment of the species-name, *scabriusculus*, is traceable to Angas in his list of N.S. Wales Marine Mollusca, P.Z.S., 1867, p. 215, where it is alluded to as a M.S.-name in Coll. Cuming by H. Adams and Angas, with the remark, "a very small species differing from *E. baccatus* in its cancellated sculpture and being umbilicated; length, 2 lines." These comparative characters are sufficient had we the two species only before us, but they are inadequate to locate the species among congeners. However, I think the best interests of conchology will be served by employing Angas' name, though perhaps a rigid application of the law of priority would require the substitution of Tenison-Woods' name.

Based upon four Tasmanian examples, I have drawn the following brief description :—The colour is ashen-reddish beneath a thin epidermis (I fail to recognise the red spots disposed in oblique lines mentioned by Ten.-Woods). There are four cinguli on the penultimate whorl, in one example a small cingulus between the third and fourth, which are larger than the other two; the last whorl has eight cinguli between the beaded umbilical border and the suture.

The S. Australian examples which I refer to, *E. scabriusculus*, have never less than five cinguli on the penultimate whorl, sometimes all equal, in others the medial one slender; on the last whorl the cinguli vary from ten to thirteen, more frequently twelve. The colour is bluish-grey to reddish-brown, whilst the beaded umbilical margin is conspicuously white.

(361) Euchelus vix-umbilicatus, *Tate* (ante p. 196).

(362) Euchelus pumilio, *Tate* (ante p. 196).

Subemarginula stellata, *A. Adams.*

Clypidina stellata, P.Z.S., 1851, p. 87 ; Reeve, Icon. Con., t. 8, f. 56 ; Tryon, Man. Conch., vol. XII., p. 283, t. 29, f. 33.

St. Vincent Gulf in shell-sand (two examples) ; also N.S. Wales.

Patella aculeata, *Reeve.*

Conch. Icon., f. 90 ; Tryon, Man. Conch., vol. XIII., p. 100, t. 62.

Rosetta Head (dead shells) ; also N.S. Wales and Tasmania.

Patella stellaeformis, *Reeve.*

Conch. Icon., figs. 48, 53 ; Tryon, *op. cit.*, p. 98, t. 17, f. 25, &c.

Rosetta Head and Fowler Bay ; also N.S. Wales to Japan.

Acmaea saccharina, *Linne.*

Var. stellaris, Quoy and Gaimard, Voy. Astrolabe, t. 71, f. 1-4.

Fowler Bay and Wallaroo Bay ; also Tasmania, and New South Wales, &c.

Acmaea Jacksoniensis, *Reeve.*

Patella, Icon. Conch., f. 127 ; Tryon, *op. cit.*, t. 42, f. 71-75.

P. Gealei, Angas, is, in my opinion, a synonym.

(405). Ischnochiton Haddoni, *Pilsbry.*

Tryon's Man. Conch., vol. XIV., p. 88, t. 22, figs. 67-73.

The Australian examples of the so-called *I. longicymba* are shown by the above-named author to differ specifically from the New Zealandian species of that name.

Ischnochiton (Ischnoradsia) australis.

Chiton australis, Sow., Mag. Nat. Hist., 1840, Conch. Illus., f. 46 ; Reeve, Con. Icon., sp. 10 ; *Lepidoradsia australis* (Sow.), Carpenter. Encounter Bay (two sps. in 1879); also Encounter Bay *(Dr. Perks)* and S Australia *(Mr. Adcock)* on the authority of Mr. Bednall.

A not uncommon shell in N.S. Wales and Tasmania.

Buccinulus affinis, *A. Adams.*

This N.S. Wales shell has occurred in a dead state at Moonta Bay.

Correlation of the Marine Tertiaries of Australia.

By Professor R. Tate and J. Dennant, F.G.S., F.C.S., Corr. Memb.

PART I., VICTORIA,

With Special Notes on the Eocene Beds at Spring Creek and at the Mouth of the Gellibrand River.

[Read May 2, 1893.]

Introduction.

During the last few years our knowledge of the marine tertiaries of Australia has been considerably advanced. New observers have entered the field, fresh localities have been explored, and, most important of all, some members of the series not previously known to exist on this continent have been discovered. The various beds, although not yet exhaustively searched, have yielded an exceedingly extensive suite of fossils, quite sufficient to enable geologists to come to definite conclusions concerning their relative age.

The marine tertiaries of the southern colonies belong to three distinct epochs, and adopting Lyell's method of classifying such beds, viz., by the percentage of living species they contain, the terms Eocene, Miocene, and Pliocene are as applicable to them as to the tertiary series of the Northern Hemisphere. In Europe, as is well known, a fourth subdivision, viz., the Oligocene, has been intercalated between the Eocene and the Miocene, but, so far, no beds are known in Australia which can be at all regarded as bridging over the gap between these two well-marked groups.

Extended observations have convinced us that not only all the tertiary beds hitherto called Oligocene, but also *all* those classed as Miocene by the Geological Survey of Victoria, must certainly be referred to the Eocene. These so-called Miocene beds consist usually of hard polyzoal limestones, in which, with the exception of casts of echinoderms, a few lamellibranchs and brachiopods, the identifiable fossils are comparatively scarce. By the early geologists they were said to overlie certain arenaceous and argillaceous deposits, rich in fossil remains, of supposed Oligocene or Eocene age, and were therefore assigned to a younger epoch. Our observations lead us to conclude that this order of deposition

is not invariable. According to Messrs. Hall and Pritchard, the reverse is the sequence in the Geelong district. As a fact, the fossil evidence indicates a close relationship between the two sets of strata, and we class them both as Eocene.

The recognition, a few years ago, both in Victoria and South Australia, of deposits of undoubted Miocene age, but of quite different lithological character to the prevailing calciferous rocks mentioned, supplied fresh data for the classification of the tertiaries. They invariably overlie both the so-called Oligocene and the calciferous rocks, and are usually demarked off by an eroded surface, while the general facies of their molluscan fauna, as well as the percentage of living species represented, definitely fixes their geological horizon. They are succeeded in South Australia by fossiliferous strata provisionally referred to the Older Pliocene. In Victoria the latter are wanting, but a younger member of the same group is known, and the tertiary series is thus fairly complete. If, then, the middle member of the series be Miocene, how can the inferior one, with its very much smaller percentage of recent species, be placed on the same horizon?

Compared with the Eocene, the marine Miocene and Pliocene are of limited development, the great mass of our tertiaries belonging to the oldest of the three periods. In fact, it requires careful search to recognise them at all, and they were evidently overlooked by the pioneer geologists. This is the only feasible explanation of the serious blunder committed in referring nearly all our wide-spread tertiary deposits to the Miocene period.

In support of the opinions here expressed, it will be necessary to refer briefly to the chief outcrops of the marine tertiaries in Victoria and South Australia, beginning with the Eocene. Details will be given only when the beds have not previously been described; for the rest the original papers may be consulted.

EOCENE.

The rocks of this period commence at the Snowy River, in the east of Victoria, and extend with numerous breaks along the south coast to beyond the westerly boundary of South Australia; they are also visible inland at various localities in both colonies, and appear as outliers of limited mass on the north-west coast of Tasmania.*

The sections in Victoria already described are :—

Mitchell River, Bairnsdale;† Moorabool and Barwon Rivers;‡

* *Vide* Trans. Roy. Soc. N.S.W., vol. XXII., 1888.

* Reports of Progress, Nos. 2 and 4 Geol. Survey of Victoria; Roy. Soc. of Vic., vol. III., 1891.

† Ibid, vol. IV., 1892.

Muddy Creek *(lower beds)*;* Portland, Glenelg River, and Apsley.†

1. Mitchell River, Geelong, Muddy Creek, &c.

The sections of the Mitchell river-cliffs are interesting, because both the calciferous rock and the arenaceous beds are found in close proximity, the one showing principally casts in limestone of fossil shells, and the other yielding numerous species of univalves and bivalves in an excellent state of preservation. That the difference is simply one of sedimentation and not of geological age is here abundantly plain. Certainly every species recognisable in the hard rock has also been collected in the underlying softer beds. To the south-east, on the margin of the Gippsland Lakes, and elsewhere in the vicinity, the true Miocence makes its appearance, resting against the basal part of the eroded escarpment of the forementioned Eocene cliffs.

Diagram sections, showing very clearly the stratigraphical relations of these two sets of strata, are given by Mr. Howitt in his Reports.

In comparing the results of their observations in the Geelong District with those made by us at Muddy Creek and on the Murray Cliffs, Messrs. Hall and Pritchard remark :—"The evidence we have adduced shows that in this locality as well, the sequence of the beds, as might have been expected, is similar. The deposit at Orphanage Hill, and consequently its extension up the valley of the river, is usually spoken of as Oligocene, though coloured Miocene in the quarter sheet ; while the Waurn Ponds rock, which, like the Batesford limestone, is a true polyzoal rock, is called Miocene. This is, however, a reversal of the true sequence, for the limestone is undoubtedly the underlying member of the series."

Regarding the Muddy Creek lower beds but little has to be added to what has been already recorded. The number of species has been slightly increased, and though much yet remains to be done, progress has been made in the systematic revision of the gasteropoda. Out of a total of 725 species of all classes from the two well-marked zones at Muddy Creek, 511 have been definitely traced to the lower beds. Of these, from six to eight still survive, and the percentage of recent to extinct forms is thus about one and a half. Independently of the small percentage of living species, the facies of the fauna is strikingly Eocene, and is in marked contrast to that of the overlying Miocene beds. It is significant, that of the total number of species recorded from the lower zone, only about 5 per cent. pass

* Roy. Soc. of S.A., vol. XI.

† Trans Austr. Assoc. Adv. of Science, Melb., 1890.

up into the higher, though in the former 511 and in the latter 205 species have been recognised.

Referring to the Foraminifera of the Lower Beds, Mr. Howchin remarks:—"The occurrence of *Nummulites variolaria* in very great numbers in the Lower Bed is of special interest as showing uniformity of palæontological features between the Older Tertiaries of Australia and rocks of a like age in Europe."*

2. Spring Creek.

These beds were described and mapped many years ago by the late Messrs. Wilkinson and Richard Daintree, when they were members of the Victorian Geological Survey staff. Their original report is now out of print, but extracts containing the major part of it were given by the late Prof. Martin Duncan in his description of the corals of the Australian tertiaries.† The locality was again reported on, but more generally, by Mr. F. M. Krause, in 1873. The survey of the country by these gentlemen occupied some months, and as there were no roads, and few if any inhabitants, they had difficulties to contend with which by the progress of settlement are now entirely removed.

It will be found as we proceed that the reading of the Spring Creek beds offered by us differs materially from that given in the Survey Reports. That these, as well as other tertiary sections, were misunderstood by the first observers we attribute, not so much to errors of observation, as to hasty generalisations on slender palæontological data. In the first place it was assumed that the main mass of our tertiaries was Miocene instead of Eocene. When their explorations were made, though the number of fossils collected was large, very few were identified—indeed, it is only within the last few years that the work of comparing and naming them has been systematically carried out. The attempt, therefore, to fix the horizon of the beds before analysing their fossil contents was, it must be admitted, contrary to the usual practice of geologists. As a fact, the percentage system could not be applied, and the principle of classification relied on seems to have been the resemblance of a few shells to some in the European tertiaries; whilst no account seems to have been taken of the generic grouping, which is so distinctive of the Eocene-fauna in comparison with that of the Miocene, and is, moreover, largely cosmopolitan in its distribution.

Of twenty-seven species of mollusca from strata on the same horizon as those now treated of, descriptions of which have been published by the Victorian Geological Survey, thirteen are

*Roy. Soc. of South Australia, vol. XII.

† Fossil corals (Madreporaria) of the Australian Tertiary deposits; Q. J. G. S., vol. 26, 1870.

admittedly unlike any others, fossil or recent, and thus cannot serve for comparison. For the remainder, close analogies are claimed with shells in the European tertiaries, viz., seven with Eocene, one with Oligocene, five with Miocene, and one with Pliocene forms. Even in this short list of fossils the balance is if anything favourable to the Eocene rather than to the Miocene, though with the extremely rich fauna of our tertiaries a decision either way was at the time necessarily premature.

In the second place, the beds at Spring Creek were divided into upper, middle, and lower Miocene. Waiving for a moment the question as to their being Miocene at all, we conclude, after a careful study of the section, that there is no evidence to justify a tripartite division of the strata, except that afforded by lithological differences. Sections of great thickness, and as a whole rich in organic remains, do usually show a diminution in the numbers of fossils, both specifically and individually, as they are traced to higher levels; but it does not necessarily follow that there is a palæontological break between the upper and lower portions. In the original memoir a distinction was made between beds containing bivalves and others underlying them containing chiefly univalves. *This distinction does not exist.*

The upper portions of the cliffs are, it is true, not easily accessible; but huge fallen masses detached from near the top have yielded numerous fossils, whilst intermediate portions are brought within range of observation in consequence of their dip. Those at the bottom are, as might be expected, the best preserved, and even 20 or 30 feet up many of the most fragile shells have perished, strong bivalves, such as *Pectunculus*, *Cardita*, *Limopsis*, *Cucullæa*, *Chione*, &c., chiefly weathering out on the face. From this circumstance has arisen the mistake that separate geological horizons are represented at different heights. The bivalves, brachiopods, and echinoderms supposed to be characteristic of the upper zones are also found at the base of the section, while the univalves, as *Typhis*, *Murex*, *Voluta*, *Cancellaria*, &c., are by no means confined to the lowest strata, but may be collected not only in the fallen masses referred to, but also as high up the cliffs as it is possible to reach, though in the latter position more or less decomposed, and in diminished numbers.

According to the Survey, the univalves are at the base of the section; then come the bivalves, and at the top the brachiopods and echinoderms. Now, at the northern end of the section the dip of the strata actually brings a well-marked bivalve-band down below sea-level, and it passes out of sight; while *above* it the univalves exist in greater profusion than in any other portion of the whole exposure! Again, on the southern side the polyzoal

rock full of echinoderms is at the base of the cliff, while actually resting *upon* it are strata containing the bivalves which are supposed to characterise the middle division! The fact is that the section throughout contains practically the same fossils, and the difference in the relative proportion of univalves, bivalves, brachiopods, or echinoderms present may be due to such causes as change in the sediments, and probably to certain portions of the strata representing a deeper sea deposit than the rest.

In general the polyzoal limestone is the chief repository of the echinoids and palliobranchs; the lamellibranchs are represented by species of *Ostrea*, *Pecten*, and others whose test is calcitic, the greater number of species of the class being known only as casts. The clays are rich in gastropods, the lamellibranchs are fairly-well represented, whilst palliobranchs are uncommon, and echinoids rarely present. The high state of evolution of the higher gastropods, *e.g.*, *Murex*, *Fusus*, *Triton*, *Peristernia*, *Voluta*, *Mitra*, &c., imparts to each chief locality a complexion of its own, and increases the difficulty of correlating widely separated fossiliferous clays; this phenomenon may be attributed to a degree of isolation of the different areas greater than that which obtains to-day in approximately the same areas, or it may be due to climatic effects pertaining to different oceanic currents.

The fossil-bearing cliffs commence about a mile from the mouth of Spring Creek—at Bird Rock, a small outlier of the adjoining cliff. This is a landmark well known to geologists, though quite insignificant to the ordinary visitor. It is connected with the mainland at low tide only, a circumstance which was forcibly impressed upon us more than once, when we had to wait for hours for the sea to subside between us and the fossil treasures we expected to obtain on its sides. The difficulty of getting to Bird Rock is not the only one which besets the geologist, who does not carefully time his visits with the ebb of the tide. The cliff opposite, which protrudes as to a point, cannot be rounded long after the turn of the tide, and there is no other passage to the coast beyond. Even if this point is passed there is a second formidable one a little farther on, and beyond that still another; while to be caught by the rising tide between any of these points would be extremely dangerous, for the cliffs are too abrupt to be scaled. Beyond the third point there is certainly a haven, which we were always glad to reach, and where, though close prisoners till the waters fell again, we spent many profitable hours.

The lower part of the cliff opposite Bird Rock is hollowed out into caves by the action of the waves, the strata being soft. Both in the caves and on Bird Rock itself small shells can be easily picked out with a penknife; with patience, many varieties of univalves may be collected, and generally in a good state of preservation.

Bird Rock is topped by a thin stratum of hard material corresponding with a projecting ledge on the adjoining cliff. This serves to mark the dip very clearly, which was found to be 6° to the north.

From Bird Rock, the coast curves round to the north-east, and the strata become very hard and rough, in which only fragments of fossils appear. The dip of this rugged limestone cannot be very accurately taken, but appears horizontal when viewed from the beach. At one place, however, where the cliff is cut back, the true dip is seen; it is approximately 10° to the N.N.W.

A few yards to the east of Bird Rock, a narrow flat reef is visible at low tide, commencing at the shore line and stretching fully 150 yards out to sea, not however, in a straight line, but with a gentle curve westward, as if forming a section of a large circle. Near its shore-end the dip is to the north, but this gradually changes until at the seaward extremity it is to the east. The rock is very hard, but is gradually wearing away by the formation of pot-holes on its surface. The reef is a continuation of the topmost stratum of Bird Rock, the intervening portions having been degraded. On the adjoining landward cliff, the corresponding hard band previously mentioned stands out from the inferior and superior softer strata and is continuous right to the edge of the flat rock, which is in reality a seaward extension of it. At very low tide, small sections of two outer circles also show, representing hard bands still higher up the cliff.

Along the coast in a south-westerly direction from Bird Rock, similar extensions of the cliff-strata rise at intervals from a few inches to a foot or more above low watermark, but they are mainly parallel to the coast, and stretch only a short distance seaward.

About half a mile to the south-west of Bird Rock, however, and close to the ledge in the cliffs which served as our retreat at high tide, a spit runs out for some distance and curves in an opposite direction to that on the north-east. The dip is here to the south-east and the same direction is maintained on a flat reef close to Rocky Point. The section is thus evidently a hemi-dome, the rocks in the middle inclining seawards, *i.e.*, to the east, and those on the sides to the north and south-east respectively. The strata slope more gently on the southern flank of the dome than on the northern. Exact measurements of the dip in the former direction are difficult to obtain, but it does not probably exceed three or four degrees. In the centre of the section the rocks for a short distance are apparently horizontal. The general contour of the coast in the neighbourhood of Bird Rock is well-illustrated in a lithograph copied from a photograph by the late Mr. R. Daintree, and published in the Geological Quarter-sheet, No. 28, S.E.

We did not observe any signs of disturbance in the strata, and the forces which have raised them from the bed of the sea must have operated very gradually. The tertiary strata of Australia have, as a rule, a very small inclination, and many are horizontal. There are exceptions, as at Longford, near Sale, where an Eocene limestone, full of fossils, is inclined at a high angle.

According to aneroid measurements, the highest cliff in the Spring Creek strata is 220 feet above sea-level. This is in Half Moon Bay, and is probably the summit of the hemi-dome. For about half the distance up, the usual fossils show, chiefly in bands, where they are very thick; *Pectunculus laticostatus*, *Chione Pritchardi*, *Cardita polynema* and a few other strong bivalves especially weathering out. Their predominance here has given rise to the erroneous theory, previously alluded to, that there is a separate zone of bivalves above, and another of univalves beneath. That this is not the case we proved by examining these bands where the dip brought them within reach, as univalves and other fossils supposed to be peculiar to the lower zone were plentifully mixed with the bivalves.

In the underlying softer strata the whole series was also represented—univalves, bivalves, brachiopods, polyzoa, echinoderms and corals. The remaining half of the cliff consists of red and yellowish sandy clays, with bands of hard rock. Owing to a landslip close at hand the topmost portion of these clays are accessible. At first sight they appear unfossiliferous, but on a closer examination fragments of shells, with occasionally a whole specimen, can be found scattered very sparingly among them In a two-hours' search the following were collected, chiefly on the surface of the reddish strata:—(whole shells) *Entalis Mantelli*, *Cardita delicatula*, *Limopsis Belcheri*, *Pecten Foulcheri;* (fragments) *Voluta sp.*, *Turritella sp.*, *Cytherea* or *Chione sp.*, *Cardita polynema (?)*. Our attention was first drawn to the probably fossiliferous character of these clays by information obligingly furnished by Mr. Mulder, that he had found fossils in some clays about half-way up a steep bank thirty yards north of Bird Rock, and which he supposed had fallen from above. The following fossils were found on the spot indicated by Mr. Mulder: —*Murex n. sp.*, *Peristernia lintea*, *(?) Voluta sp.*, *Ancillaria heberæ*, *A. ligata*, *Pleurotoma sp.*, *Turritella Murrayana*, *Entalis Mantelli*, *E. subfissura*, *Limopsis Belcheri*, *Pecten Foulcheri*.

In the lower of the two subdivisions of the cliff section the sediments consist mainly of soft, brown, calcareous sandstones, which not infrequently pass into hard rock. At the base of the cliff they have a dark-bluish color, which changes to a reddish-brown higher up, the first band of bivalves forming roughly a dividing line. The blue sands occur only below high-tide mark,

and even there they are turning red in places. The red color is of course simply due to the reduction of the iron in the sediments from the state of *glauconite* to a higher state of oxidation by the atmosphere, where they are not kept moist by the tide waters. It should be noted that the strata are remarkably dry, not a drop of water trickling down on any part of the cliffs.

A thin layer of ironstone is found coating some of the fallen boulders, as well as some of the rocks still *in situ*. The iron carbonate of the strata has been converted into oxide, and has segregated or blistered out at the surface. This segregation of iron-oxide, though perhaps difficult to explain, is not uncommon. Without pursuing the subject further in this paper, we may instance the red sands of Arabia, which were found by Mr. J. A. Phillip to be coated with iron in a similar manner. According to his analyses, the iron in the external coating of the grains almost equalled the total amount contained in them.*

Incidentally, reference has been made to the rugged limestones to the north-east of Bird Rock. Not only do they appear there, and also at the mouth of Spring Creek, but they crop-out again on the southern slope of the dome at Rocky Point, and continue on still farther to the south-west. They are full of polyzoal and coral remains, and contain also echinoderms, brachiopods and fragments of pectens. They are most unpromising-looking rocks, and by all previous observers have, we believe, been regarded as the topmost layer of the fossiliferous strata. From their commencement at Spring Creek they continue with a slight interruption to within a short distance of Bird Rock, when the cliffs almost suddenly change their character and become rich in gasteropods and lamellibranchs. The actual junction of the two sets of strata is concealed by fallen masses of clay, which cover the face of the cliff. On the southern slope, as previously stated, the echinoderm-rock underlies strata containing the usual bivalves, but sparingly distributed. This rock, though softer and less rugged than the polyzoal limestone on either flank of the dome, certainly represents it. The latter was followed step by step from Rocky Point in a north-easterly direction until the bivalves showed a good way up on the cliffs. A few yards farther on the strata had assumed the usual appearance, with bands of bivalves, &c., and this was maintained until the polyzoal rock was again encountered on the other side of Bird Rock. Judging, however, from some fallen boulders on the beach a little to the south of the middle of the section, certain portions of the more elevated strata, while not devoid of gasteropods, &c., evidently contain more than the usual proportion of echinoderms and

* Q. J. S. S., vol. XXXVIII., p. 112.

brachiopods, but it is doubtful whether these indicate a continuation of the echinoderm-rock observed at sea-level nearer the Point. The true explanation probably is, that there is a gradual passage of the one kind of rock into the other, the changes in the relative proportions of gasteropods and lamellibranchs to echinoderms, brachiopods, &c., being dependent upon conditions already alluded to.

The base of the tertiary strata is not visible in the neighbourhood of Spring Creek. Mesozoic rocks make their appearance at Point Castries, about 20 miles to the west, and continue thence over a wide area. They also crop out on the north, at Mount Moriac, about 12 miles distant.

At the Eagle's Nest, near Airey's Inlet, strata containing echinoderms and brachiopods of the same species as those from Spring Creek, and therefore, also of Eocene age, are underlain by the "Older Basalt" of the colony. The outcrop there is described by the Survey as a black sub-columnar rock, and as probably analogous to the Western Port basalt.

This basalt rests directly upon Mesozoic strata at San Remo, on the eastern shore of Western Port, while at Flinders, on the west, it is overlain by the Eocene tertiary. The "Older Basalt" is commonly called Miocene, because the strata overlying it were assumed to belong to that period. Instead of such being the case, they are, as we have endeavoured to prove, of Eocene age, and the epoch of the basalt must be correspondingly altered. It cannot be younger than Eocene, and may ultimately prove to be Cretaceous.

3. Gellibrand.

The deposits generally known as the "Gellibrand-beds" are, nevertheless, actually situated on the coast, east and west of the river's mouth. The village of Princetown, 12 miles east of Port Campbell, is a convenient centre to work from.

The cliffs on this part of the coast are so precipitous, that the beach is accessible only in a few places. Towards Princetown the slope is more gradual, but the dense undergrowth and the broken character of the ground make the descent very difficult. Fortunately, steps have been cut, and a rude kind of ladder made by Dr. Curdie, a former settler, quite close to the fossiliferous banks, and they can be reached with comparative ease.

The most interesting section is about three miles west of the Gellibrand, and is apparently the same as that described by the Survey in the report already referred to. In that report the deposit is called Miocene, but in more recent publications of the Survey this is altered to Oligocene. As before intimated, wherever the latter term is used, the Lower Tertiary or Eocene beds are indicated.

Briefly, the section may be described thus:—Blue clay from 80 to 90 feet thick, highly fossiliferous; yellowish clay 20 to 30 feet; and above this about 40 feet of recent calcareous sandstone of æolian origin. The upper part of the blue clay is turned yellow in places by drippings from above.

The easiest method of getting fossils in the blue clay is to look closely for those that have weathered out, either wholly or partially, from the face. Occasionally, the cliffs have weathered down so much that mounds of clay only are left; on the surface of these, small shells are abundant. It requires very hard work and great patience to unearth fossils with the pick, though sometimes fine specimens are thus obtained. On our first visit we made a large collection without much trouble, the shells weathered out on the cliffs and clay-mounds for many years evidently falling to us. On returning a year later, we were unable to increase our stock much, the interval being too short for another crop to weather out.

The amount of dip in the strata is, according to the Survey, 5°; we made it 4°, which is not a wide divergence in this kind of rock. But in regard to the *direction* of the dip, there is a marked disagreement betwen the observations, not only here, but also at another special section to the eastward. As certain conclusions formed concerning the tertiary deposits of this area depend in a great measure upon the direction in which the strata incline, it will be necessary to enter into details.

Speaking of the section just described, the Survey Report says:—"The section is taken nearly at the apex of an anticlinal curve of the strata, which now dip N.W. at 5° for nearly a mile, when they become nearly horizontal. . . . . From here the strata gently undulate until within a short distance of Curdie's Inlet, when they dip to the west and disappear at sea level. . . . . At Port Campbell the cliffs . . . . dip S.W. at 5°; they contain very few fossils. They exhibit numerous faults in the cliff section; in the short distance of a mile I observed five or six of them."

The dip here given is approximately in the direction of the coast line, and, if correct, the beds would of course fall to sea-level, and pass out of sight; to account, therefore, for their repeated reappearance on the coast further west, as near the Sherbrook River and other places, there must either be faults in the strata or a series of anticlines and synclines. Instead of the dip at this section being north-west, we make it W. 12° S., *i.e.*, almost to seaward. At the other section referred to, a similar dip was observed, both in direction and amount, though, according to the survey, it changes to the east. When the real direction of the dip, viz., west by south, is recognised, there is no

difficulty in reading the sections right along the coast from the mouth of the Gellibrand to Curdie's Steps, on to the Sherbrook River, and thence to Port Campbell, the most westerly point we examined.

As before said, the inclination of the beds is approximately seaward, the general trend of this somewhat broken coast being to the north-west. The strata, therefore, appear horizontal whenever a cliff happens to be cut at right angles to the dip, and seem to rise or fall according as the coast line changes in direction slightly towards the north or west. There is certainly no evidence of disturbance here any more than there is in similar strata in more westerly areas, where the beds are practically horizontal. In order to bring the same beds again into view at Camperdown, Muddy Creek, &c., at comparatively low elevations, we must adopt the reasonable theory that there are long undulations, or rolls, in the strata, altogether unrecognisable in a single outcrop. (See pl. 2.)

The second or more eastward section mentioned is about half a mile from the river mouth, and just opposite Bowker's Hotel, in the village of Princetown. It is only about four feet thick, and is raised above the beach from 30 to 40 feet, the underlying portion being hidden by masses of recent dune-limestone fallen from above. The strata consist of hard sandy rock, much impregnated with iron. There is also a layer of ironstone pebbles firmly cemented together, resembling in appearance the bog iron ore on a swamp bottom. It is possible that the ironstone is actually *in situ*, and has been formed by the percolation of water containing iron in solution through the strata.

By the Survey the section is called Miocene, and is supposed to represent strata overlying the blue clays at Curdie's Steps. The evidence relied on to establish this sequence is, mainly, the direction of the dip in the two sections, but the observations made were, as we have shown, erroneous.

Very few fossils can be extracted from such strata, but among them we noticed *Pecten semilaevis* and other pectens, *Spondylus gaederopoides*, Echinoderms, and Polyzoa characteristic forms of the Eocene, but unrecognised, or very sparingly so, in the Miocene, and we conclude, therefore, that just as at Spring Creek, the former group is the only one present in the marine tertiaries of the Gellibrand.

East of the river we found but few fossils, and none in the blue clays. About a mile and a half from the mouth, Mesozic sandstones emerge from beneath the Eocene strata, but it is doubtful whether they extend much further westward. What formation underlies the coast tertiaries in that direction is unknown, as, from Gellibrand to the border of the colony, and

far on into South Australia, the outcropping strata consist of the same, or still younger, rocks.

A list of the fossils collected is given in the appendix. With few exceptions, they are identical with those from Muddy Creek *(lower bed)*. On the Geological Map of Victoria, the blue clays are marked as Oligocene (Eocene), and bracketed with the Mornington beds, which they closely resemble.

4. Bullen Merri and Gnotuk Lakes.

In the volcanic country around Camperdown these lakes form prominent and very interesting features. They are situated in a deep hollow, with steep banks leading down to the water's edge. A narrow ridge, not more than 20 feet at the lowest part above the surface of Bullen Merri, though very much more than that above Gnotuk, separates the two lakes.

Both on the shores, and for some distance up the banks of Lake Bullen Merri, the only one we visited, fossil shells are fairly plentiful. When we were there the supply was more limited than usual, as one of our party had picked up all he could find a few days before. However, as he submitted them to our inspection shortly afterwards, we decided to forgive him. We are indebted to the same gentleman for a collection of shells from Gnotuk. From the latter only 39 species were obtained, but from Bullin Merri the number recorded is 104. Of the Gnotuk species, 14 are absent from the Bullin Merri gatherings, so that the actual total amounts to 116. By reference to the tabulated list of species appended, it will be seen that the deposit belongs to the Muddy Creek *(lower beds)* and Gellibrand types. Its elevation is—for Gnotuk 391 feet, and for Bullin Merri 531 feet above sea-level, the surface of the water being in the latter lake 140 feet above that in the former. For information concerning levels in the two lakes we have to thank Mr. King, the Engineer of the Shire of Hampden.

5. Warrnambool.

The recent dune-limestone is the prevailing rock at Warrnambool, and though tertiary strata were known to exist, it is only lately that fossils have been obtained. The credit of finding them belongs to Mr. A. D. Dobson, a late arrival in the town, and it is remarkable that they escaped observation so long. The fossiliferous sections commence close to the mouth of the Hopkins, and continue for a few miles up the river. The rocks consist of the well-known rugged limestones, in which the fossils, principally casts, are with difficulty extracted whole. Overlying them is the æolian limestone just mentioned, rough and jagged, like the fossil-bearing strata beneath, but easily distinguishable

by its constantly changing dip. The fossils are exceedingly scarce in the cliffs, but the following list, though a very short one, sufficiently indicates their horizon :—*Chthamalus sp.*, ? *Voluta sp.* (casts), *Pecten Foulcheri, var., P. Gambierensis, Walhheimia insolita, Magasella Woodsiana, Lovenia Forbesi* (numerous), spines of *Cidaris sp.*, and bryozoan remains.

6. Mornington and Cheltenham.

In the Prodromus of the Palæontology of Victoria, the first of these two deposits is correctly placed at the base of the tertiary series, but to the second a most unwarrantable position is assigned, viz., in the Pliocene division. The number of species from both has been greatly increased recently, fully 400 being now recorded from Mornington, and 126 from the less prolific beds at Cheltenham. As it is intended to describe them in detail in a succeeding paper, we will merely say at present that the former is certainly Eocene, and that the latter belongs, probably, to a higher level of the same group.

MIOCENE.

The beds previously described are :—Muddy Creek (upper beds),* Jemmy's Point,† Portland and Glenelg River.‡

The number of species now definitely traced to the Upper deposit at Muddy Creek is 205, but as a large proportion of these are still undescribed, its classification, strictly on the percentage system, must be postponed. Thirteen of the species, or rather more than 6 per cent., are certainly recent, and it is probable that this number will be at least doubled by a critical examination of all the fossils. Twenty-seven species, or 13 per cent., pass down into the underlying Eocene zone; several of these are prevailing forms, spread throughout the whole series. In its general facies, the fauna of the upper zone at Muddy Creek bears a striking resemblance to that in the Jemmy's Point deposit, though in the latter the percentage of living species is much higher, reaching fully 16 per cent.

In summarising his examination of the Foraminifera of Muddy Creek, Mr. W. Howchin, F.G.S., makes the following remarks upon the distinction between the upper and lower zones at Muddy Creek :—"The stratigraphical distinction between the two beds of the section concerned is sufficiently marked from the fact that the Foraminifera common to both only amount to 28 per cent. of the whole. There is also a marked change in the general facies of the rhizopodal fauna as we pass from the lower to the upper

* Roy. Soc. of S. Austr., vol. XI.
† Roy. Soc. of Vic., vol. III., 1891.
‡ Trans. Austr. Assoc. Adv. of Science, Melbourne, 1890.

geological horizon, pointing to a shallowing of the sea bottom, which is indicated not only by the relatively larger numbers of shallow-water species in the upper beds, but these are proportionally more numerous and better developed as individuals."*

Quite a large area in the south-west of Victoria, including nearly the whole of the county of Follett and a portion of Normanby, is occupied by strata which have been tentatively included in the Miocene. The deposit is of moderate thickness, nowhere perhaps more than from 20 to 30 feet through, and from the prevalence of a species of oyster in it has been named Ostrea-limestone. This, together with two other common fossils accompanying it, belong to living species; but besides these there are casts of other shells, which can only be doubtfully determined. The three living species referred to do not occur in the Miocene strata just described, and the Ostrea-limestone is classified as Miocene chiefly on stratigraphical grounds. It overlies the Eocene calciferous rock, and was certainly deposited before the Pliocene beds to be mentioned presently At Portland its junction with the Eocene rock is very plainly seen, a pebble band, a few inches thick, separating the two. Fine sections of the Ostrea-limestone are visible on the Glenelg cliffs at Dartmoor, and the same rock has been traced through Strathdownie, and on to the Dismal Swamp, just across the border in South Australia. Lithologically, the strata consist of flaggy limestones showing much false bedding. When disintegrated, they form immense beds of sand, which become the leading feature of the country where the formation prevails. Where the rock is exposed it is often smooth, and breaks up into flat cakes of limestone, which are so thickly strewn over the ground in places as to make it difficult to drive over the roads. Possibly these blocks of stone may sometimes consist of travertine, formed by the re-deposition of carbonate of lime, which has first been dissolved out by water from the original rock; that this is not the case for all of them is certain, as they frequently contain fossil shells.

NEWER PLIOCENE.

The only marine Pliocene outcrop known in Victoria is that on the Glenelg River, at Limestone Creek, described a few years ago.† It rests upon the polyzoal rock, and from its position is evidently of later date than the Ostrea-limestone on the top of the river cliffs. The proportion of living to extinct species of mollusca present amounts to more than 80 per cent., so that it must be referred to the latter part of the Pliocene period.

* Roy. Soc. S. Aus., vol. XII.

†Roy. Soc. of Victoria, vol. XXIII., 1887; and Trans. Aust. Assoc. Adv. of Science, Melb., 1890.

The section is a very instructive one, as it throws much light upon the geological history of the Lower Glenelg, and the surrounding area, during Pleistocene and recent times. Since its deposition, hundreds of square miles of land have emerged from the ocean, through which the Glenelg has since cut a channel 120 miles long, over 100 feet deep, and from 100 yards to nearly a mile in width. Moreover, the outpouring of the sheets of lava, which cover a great part of the surface in the South-West, is probably a subsequent event; while it is certain that one entire formation, the Dune-limestone, now the most striking feature of the coast scenery, belongs to a still later period.

LIST OF FOSSILS.

The list of fossils is incomplete in the Family Pleurotomidae (as its very considerable number of species have not yet been elaborated), and in the class Polyzoa, whilst the Foraminifera are wholly omitted. The asterisk (*) in the geographical columns indicates that the occurrence is restricted.

	Other Occurrences.					
	Spring Creek	Gellibrand	Camperdown	Muddy Creek	Mornington	
MAMMALIA.						
Squalodon Wilkinsoni, *McCoy* ...	*	.	.	.	.	
CEPHALOPODA.						
Aturia australis, *McCoy*	x	x	.	x	.	
Nautilus transennus, *Tate* ...	.	*	.	.	.	
Spirulirostra curta, *Tate*	*	.	.	.	.	
GASTROPODA.						
Typhis acanthopterus, *Tate* ...	.	x	x	.	x	
laciniatus, *Tate*	x	.	x	x	.	
McCoyii, *Ten.-Wds.* ...	x	.	x	x	.	
evaricosus, *Tate*	.	x	.	x	.	
Murex velificus, *Tate*	x	x	x	x	x	
rhysus, *Tate*	.	x	.	.	x	
lophoessus, *Tate*	.	x	x	x	x	
amblyceras, *Tate*	.	x	.	x	x	
Eyrei, *Ten.-Wds.*	x	x	.	x	x	
camplytropis, *Tate*	.	x	.	x	x	
asperulus, *Tate*	x	x	.	x	x	
prionotus, *Tate*	.	x	.	.	.	Adelaide
sublævis, *Tate*	x	.	.	.	.	Adelaide
Trophon expansilabrum, *Tate* ...	*	.	.	.	.	
fontinalis, *Tate*	*	.	.	.	.	
elatus, *Tate*	.	*	.	.	.	
polyphyllus, *Ten.-Wds.* ...	x	.	.	x	x	
Rapana aculeata, *Tate*	x	x	.	x	x	
Ranella (Argobuccinum) Prattii, *Ten.-Wds.*	.	x	.	x	x	
Triton Woodsii, *Tate*	.	x	x	x	x	
cyphus, *Tate*	.	x	.	x	x	

textilis, *Tate*	.	x	.	x	x		
annectans, *Tate*	.	x	x	x	.		
tumulosus, *Tate*	.	x	.	x	x		
tortirostris, *Tate*	x	x	x	x	x		
gemmulatus, *Tate*	.	x	.	x	x		
granoliratus, *Tate*	.	*	.	.	.		
fodinalis, *Tate*	.	*	.	.	.		
Distorsio interposita, *Tate*	*	.	.	.	.		
Epidromus tenuicostatus, *Ten.-Wds.*	.	x	.	x	.		
texturatus, *Tate* ...	.	x	.	x	x		
intertextilis, *Tate* ...	*	.	.	.	.		
Fusus foliaceus, *Tate*	.	x	.	x	x		
acanthostephes, *Tate* ...	x	x	x	x	x		
craspedotus, *Tate*	.	x	x	x	x		
senticosus, *Tate*	.	x	.	x	x		
dictyotis, *Tate*	.	x	.	x	x		
hexagonalis, *Tate*	.	x	.	x	.		
simulans, *Tate*	.	.	x	x	.		
macrorhynchus, *Tate* ...	*	.	.	.	.		
Latirofusus aciformis, *Tate* ...	.	x	.	x	x		
alternans, *Tate*	*	.	.	.	.		
Fasciolaria exilis, *Tate*	.	x	.	x	x		
cristata, *Tate*	.	x	.	x	x		
cryptoploca, *Tate* ...	.	x	.	x	.		
rugata, *Tate*	.	x	.	x	x		
decipiens, *Tate* ...	.	x	.	x	.		
Dennanti, *Tate* ...	.	*	.	.	.		
Gellibrandensis, *Tate* ...	.	x	.	.	.	Fyansford	
Siphonalia dictyotis, *Tate*	x	x	.	.	.		
longirostris, *Tate* ...	x	x	x	x	x		
Tatei, *Cossmann* ...	.	x	.	x	x		
ischna, *Tate*	.	x	.	x	.	Fyansford	
Sipho crebrigranosus, *Tate*	.	x	.	x	.		
Peristernia lintea, *Tate*	.	x	x	x	.		
succincta, *Ten.-Wds.* ...	.	x	.	x	.		
interlineata, *Tate* ...	.	x	.	x	.		
Murrayana, *Tate* ...	.	.	x	.	.	R. Murray, Belmont	
subundulosa, *Tate* ...	.	x	.	x	.		
tenuistriata, *Tate* ...	.	*	.	.	.		
dyscrita, *Tate*	.	*	.	.	.		
crassilabrum, *Tate* ...	*	.	.	.	.		
rudis, *Tate*	*	.	.	.	.		
Tritonidea acrobeles, *Tate*	.	*	.	.	.		
Hallii, *Tate*	x	.	.	.	.		
Dennantia Ino, *Ten.-Wds.*	.	x	.	x	x		
cingulata, *Tate*	.	x	.	.	x		
tenuisculpta, *Tate* ...	.	x	.	.	.	Fyansford	
Leucozonia staminea, *Tate*	.	x	.	.	x		
Zemira precursoria, *Tate*	.	x	.	x	.		
Eburnopsis tessellatus, *Tate* ...	*	.	.	.	.		
lateliratus, *Tate*	.	.	x	x	.		
Phos variciferus, *Tate*	.	x	.	x	x		
Nassaria tabulata, *Tate*	*	.	.	.	.		
Nassa Tatei, *Ten.-Wds.*	x	x	.	x	x		
Lyria harpularia, *Tate*	.	x	.	x	x		
Voluta Hannafordi, *McCoy* ...	.	x	.	x	x		
McDonaldi, *Tate*	.	x	.	x	x		

limbata, *Tate*	.	x	.	.	x		
macroptera, *McCoy*	*	.	.	.	.		
acuminata, *Tate*	*	.	.	.	.		
lirata, *Johnston*	.	x	.	x	.		
pseudolirata, *Tate*	.	x	.	x	x		
strophodon, *McCoy*	.	x	x	x	x		
antiscalaris, *McCoy*... ...	.	x	x	x	x		
anticingulata, *McCoy* ...	x	.	.	.	.	Table Cape	
Weldii, *Ten.-Wds.*	.	.	x	x	.		
sp.	*	.	.	.	.		
ancilloides, *Tate*	.	x	.	x	x		
McCoyii, *Ten.-Wds.* ...	.	x	.	x	x		
sarissa, *Tate*	x	.	.	x	.		
pagodoides, *Tate*	x	.	.	.	.	Adelaide	
cathedralis, *Tate*	x	.	.	x	.		
uncifera, *Tate*	x	.	.	.	.	R. Murray	
Mitra alokiza, *Ten.-Wds.*	.	x	.	x	x		
dictua, *Ten.-Wds.*	.	x	.	x	.		
ligata, *Tate*	.	x	x	x	x		
othone, *Ten.-Wds.*	.	x	.	x	x		
atractoides, *Tate*	x	x	x	x	.		
leptalea, *Tate*	.	x	x	x	x		
exilis, *Tate*	.	x	.	x	.		
paucicostata, *Tate*	.	x	.	x	x		
biornata, *Tate*	.	x	.	x	.		
semilævis, *Tate*	.	x	x	x	x		
conoidalis, *Tate*	x	.	.	x	.		
fontinalis, *Tate*	*	.	.	.	.		
clathurella, *Tate*	.	x	.	x	.		
Marginella Winteri, *Tate*	x	.	.	x	.		
Woodsii, *Tate*	.	x	.	x	.		
propinqua, *Tate* ...	.	x	x	x	x		
Wentworthi, *Ten.-Wds.*	.	x	x	x	x		
submicula, *Tate* ...	.	x	.	x	.		
micula, *Tate*, var. ...	.	x	x	.	.	Table Cape	
strombiformis, *Ten.-Wds.*	x	x	.	.	.	Table Cape	
obconica, *Tate*	*	.	.	.	.		
globiformis, *Tate* ...	x	.	.	x	x		
cymbula, *Tate*	*	.	.	.	.		
Oliva Adelaidæ, *Tate*	x	x	x	.	.	Adelaide	
Ancillaria orycta, *Tate*	x	.	x	.	.	Cheltenham, Mioc., Gippsland	
apiculata, *Tate*	*	.	.	.	.		
hebera, *Hutton*	x	.	.	x	.		
ligata, *Tate*	x	.	x	.	.		
pseudaustralis, *Tate* ...	x	x	x	x	x		
semilævis, *Ten.-Wds.* ...	x	.	.	x	x		
Harpa lamellifera, *Tate*	.	x	.	x	.		
pachycheila, *Tate*	*	.	.	.	.		
Columbella clathrata, *Tate*... ...	.	x	.	x	.		
Cainozoica, *Ten.-Wds.*	.	x	.	x	x		
funiculata, *Ten.-Wds.* ...	.	x	x	x	x		
atratæformis, *Tate* ...	.	x	.	x	.		
curtansata, *Tate* ...	.	x	.	x	.		
nodulosa, *Tate*	.	x	.	x	.		
granosa, *Tate*	*	.	.	.	.		
lirata, *Tate*	*	.	.	.	.		
aciculata, *Tate*	.	x	.	x	x		

crenulifera, *Tate* ...	*	.	.	.	.	
Oxleyi, *Ten.-Wds.* ...	x	.	.	.	.	Table Cape
Cancellaria platypleura, *Tate* ...	.	x	.	x	.	
varicifera, *Ten.-Wds.* ..	x	x	x	x	x	
ptychotropis, *Tate* ...	x	.	.	.	.	Adelaide
Etheridgei, *Johnston* ...	x	.	.	.	.	Table Cape
capillata, *Tate*	x	.	.	x	x	
fontinalis, *Tate*... ...	*	.	.	.	.	
lauta, *Tate*	*	.	.	.	.	
continua, *Tate*	x	.	.	.	.	Belmont
Terebra platyspira, *Tate*	.	x	.	x	.	
additoides, *Ten.-Wds.* ...	x	.	.	x	.	Table Cape
simplex, *Ten.-Wds.* ...	x	.	x	x	.	Table Cape
Cassis exigua, *Ten.-Wds.*	.	x	.	x	.	
Semicassis transenna, *Tate*... ...	.	x	.	x	x	
Cassidaria gradata, *Tate*	.	x	x	x	x	
Wilsoni, *Tate*	*	.	.	.	.	
Trichotropis quinquelirata, *Tate* ...	*	.	.	.	.	
apicilirata, *Tate* ...	x	.	.	.	x	
Conus Dennanti, *Tate*	x	x	.	x	.	
pullulescens, *Ten.-Wds.* ...	x	x	.	x	x	
extenuatus, *Tate*	x	x	x	x	.	
cuspidatus, *Tate*	.	x	x	x	x	
ligatus, *Tate*	.	x	.	x	x	
heterospira, *Tate*	.	x	.	x	x	
acrotholoides, *Tate*	.	x	.	.	x	
Dolichotoma angustifrons, *Tate* ...	.	x	.	x	x	
decomposita, *Tate* ...	.	x	.	.	.	Fyansford
asperulata, *Tate* ..	.	.	x	x	.	
fontinalis, *Tate* ...	*	.	.	.	.	
Pleurotoma perarata, *Tate*... ...	x	x	x	x	.	
consutilis, *Ten.-Wds.*...	.	x	.	x	.	
Murndaliana, *Ten.-Wds.* .	.	x	.	x	.	
Claræ, *Ten.-Wds.* ...	.	x	.	x	.	
Samueli, *Ten.-Wds.* ...	.	x	.	x	.	
paracantha, *Ten.-Wds.*	x	.	x	.	.	Table Cape
cristulata, *Tate* ...	*	.	.	.	.	
hemipsila, *Tate*, var. ...	x	.	.	x	.	
Drillia integra, *Ten.-Wds.*	.	x	.	x	.	
Johnstoni, *Ten.-Wds.* ...	x	.	.	.	.	Table Cape
fusiformis, *Hutton*	x	.	.	.	.	
Bela sculptilis, *Tate*, var.	x	.	.	x	.	
Woodsii, *Tate*	x	.	.	x	.	Table Cape
tenuisculpta, *Ten.-Wds.* ...	x	x	.	x	.	Table Cape
Mangelia bidens, *Ten.-Wds.* ...	.	.	x	x	.	
Raphitoma daphnelloides, *Ten.-Wds.*	x	.	.	x	.	
Daphnella gracillima, *Ten. Wds.* ...	x	x	x	x	x	
Pusionella hemiothone, *Ten.-Wds.*	.	x	.	x	.	
columbelloides, *Ten.-Wds.*	x	.	.	.	.	Table Cape
Cypræa contusa, *McCoy*	.	x	.	x	x	
subpyrulata, *Tate*	.	x	.	x	.	
brachypyga, *Tate*	.	x	.	x	x	
pyrulata, *Tate*	.	x	.	x	x	
leptorhyncha, *McCoy* ...	x	.	.	x	x	
eximia, *G. B. Sow.*	.	x	.	x	x	
platyrhyncha, *McCoy* ...	*	.	.	.	.	? Table Cape
gigas, *McCoy*	x	x	.	x	x	
platypyga, *McCoy*	.	x	.	x	x	
dorsata, *Tate*	.	x	.	x	x	

Trivia avellanoides, *McCoy* ...	x	x	x	x	x		
Erato australis, *Tate*	x	x	.	.	.	Aldinga	
Crossea semiornata, *Tate*	*	.	.	.	.		
Scalaria microrhysa, *Tate*	*	.	.	.	.		
pleiophylla, *Tate*	x	.	.	Aldinga, Corio Bay			
polynema, *Tate*	*	.	.	.	.		
oryeta, *Tate*	x	.	.	x	.		
leptalea, *Tate*	.	.	*	.	.		
Natica Hamiltonensis, *Ten.-Wds.*...	x	x	.	x	x		
polita, *Ten.-Wds.*	.	x	x	x	x		
limata, *Tate*	x	.	.	x	.		
Wintlei, *Ten.-Wds.*	x	.	.	.	.	Table Cape	
subNoæ, *Tate*	x	.	.	.	.	Table Cape	
substolida, *Tate*	.	.	x	x	.	R. Murray	
(Sigaretopsis) subinfundibulum, *Tate*	.	x	x	x	x		
Sigaretus microstira, *Tate*	*	.	.	.	.		
Calyptræa undulata, *Tate*	x	.	.	x	.		
Solarium acutum, *Ten.-Wds.* ...	.	x	.	x	.		
squamogranosum, *Tate* ...	.	x	.	x	.		
Torinia Simsoni, *Tate*	x	.	.	.	.	Table Cape	
ephamilla, *Tate*	.	x	.	x	.		
Turritella Murrayana, *Tate* ...	x	x	.	x	.		
tristira, *Tate*	.	x	x	.	x		
fontinalis, *Tate*	x	.	.	.	.	Table Cape	
acricula, *Tate*	.	x	x	x	.	R. Murray	
septifraga, *Tate*	*	.	.	.	.		
platyspira, *Ten.-Wds.* ...	.	x	.	x	.		
Vermetus conohelix, *Ten.-Wds.* ...	x	x	.	.	.	Table Cape	
Tenagodus occlusus, *Ten.-Wds.* ...	x	x	.	x	x		
Eulima Danæ, *Ten.-Wds.*	x	x	x	x	x		
arcigerens, *Tate*	.	*	.	.	.		
Niso psila, *Ten.-Wds.*	.	x	x	x	x		
Eulimella porrecta, *Tate*	x	.	.	.	.		
Leiostraca Johnstoni, *Tate*	x	.	.	x	x		
Turbonilla cylindrica, *Tate*	.	x	.	.	.		
liræcostata, *Ten.-Wds.*...	x	.	.	.	.	Table Cape	
Actæopyramis olivellæformis, *Tate*	x	.	.	x	.		
Odostomia microlirata, *Johnston?* ...	x	.	.	.	.	Table Cape	
leptoskeles, *Tate* ...	.	x	.	x	.		
decurtata, *Tate*	.	x	.	x	.		
Mathilda transenna, *Ten.-Wds.* ..	x	.	.	x	.	R. Murray	
angulifera, *Tate*	.	x	.	x	.		
multilirata, *Tate*	.	*	.	.	.		
Cerithium cribarioides, *Ten.-Wds.*	x	x	x	x	x		
apheles, *Ten.-Wds.* ...	.	x	.	x	x		
Ataxocerithium fenestratum, *Tate*	.	x	.	x	.		
Triforis sulcata, *Ten.-Wds.*	x	.	.	x	.		
Wilkinsoni, *Ten.-Wds.* ...	.	x	.	x	x		
planulata, *Ten.-Wds.* ...	.	x	.	x	.		
Lovenella platyspira, *Tate*	x	.	.	.	.		
marginata, *Tate*	.	x	.	.	.		
accrescens, *Tate*	.	x	.	.	x		
linneata, *Tate*	.	x	.	x	.		
quinquelirata, *Tate* ...	.	x	.	.	.		
subimbricata, *Tate* ...	.	x	.	.	.		
nodulifera, *Tate*	.	x	.	.	.		
(Cinctella) ornithopetronica, *Tate*	x	.	.	x	.		

Risella alta, *Tate*	*	.	.	.	.		
Fossarus (Isapis) eothinos, *Tate* ...	*	.	.	.	.		
Rissoa (Cingula) varians, *Tate* ...	x	x	.	x	x		
Rissoina Mulderi, *Tate*	*	.	.	.	.		
platycheila, *Tate*	.	x	.	x	x		
Adeorbis marginatus, *Tate*	*	.	.	.	.		
Liotia Roblini, *Ten.-Wds.*	.	x	.	x	x		
Delphinula aster, *Tate*	.	x	.	x	x		
Astralium quadriseriale, *Tate* ...	*	.	.	.	.		
longispinum, *Tate* ...	*	.	.	.	.		
Collonia parvula, *Ten.-Wds.* ...	x	x	.	x	x		
Leptothyra fontinalis, *Tate*	x	.	.	.	.		
Cantharidus subalternans, *Tate* ...	.	x	.	x	x		
biserialis, *Tate*	.	x	.	.	.		
cavatus, *Tate*	.	x	.	x	.		
Phasianotrochus tenuisculptus, *Tate*	*	.	.	.	.		
Eumargarita strigata, *Ten.-Wds.* ...	x	.	.	x	x		
lucens, *Tate*	*	.	.	.	.		
Gibbula echinulata, *Tate*	x	x	x	.	.		
Calliostoma lithocolletum, *Tate* ...	*	.	.	.	.		
ornithopetronicum, *Tate*	*	.	.	.	.		
inornatum, *Tate* ..	*	.	.	.	.		
escharoides, *Tate* ...	x	x	.	x	.		
C. (Astele) fontinale, *Tate*	x	x	.	.	.		
seminornatum, *Tate* ...	.	.	x	x	x		
Euchelus subfenestratus, *Tate* ...	*	.	.	.	.		
Fissurellidæa laqueata, *Tate* ...	.	x	.	.	x		
malleata, *Tate* ...	.	x	.	x	.		
Emarginula aduncta, *Tate*	x	.	.	.	.		
cymbium, *Tate* ...	.	x	.	x	x		
aperturata, *Tate* ...	.	x	.	.	x		
cassida, *Tate*	.	x	.	x	x		
Subemarginula occlusa, *Tate* ...	.	x	.	x	x		
Chiton sp.	x	.	.	.	.		
Bulla scrobiculata, *Ten.-Wds.* ...	.	x	.	x	.		
Tornatella scrobiculata, *Ten.-Wds.*	x	.	.	x	x		
olivellæformis, *Tate* ...	*	.	.	.	.		
Ringicula lactea, *Johnston*	x	.	x	x	.		
Cylichna exigua, *Ten.-Wds.* ...	x	.	.	x	.		
crebrelineata, *Tate* ...	x	x	.	.	.	Fyansford	
paucilineata, *Tate* ...	x	x	.	x	x		
imparistriata, *Tate* ...	.	x	x	x	.		
Volvaria sp.	x	.	.	x	.	Table Cape	
Utriculus sp.	x	.	.	x	.		
SCAPHOPODA.							
Entalis annulatum, *Tate*	x	.	.	x	.		
Mantelli, *Zittel*	x	x	x	x	x		
subfissura, *Tate*	x	x	x	x	x		
Dentalium aratum, *Tate*	x	x	x	x	x		
lacteum, *Deshayes* ...	.	x	.	x	.		
bifrons, *Tate*	x	.	.	.	.		
Cadulus mucronatus, *Tate*	x	.	.	x	.		
PTEROPODA.							
Vaginella eligmostoma, *Tate* ...	.	x	.	x	x		
LAMELLIBRANCHIATA.							
Gryphæa tarda? *Hutton*	x	x	.	.	.	Aldinga	
Anomia fontinalis, *Tate*	x	.	.	.	.		
Placunanomia sella, *Tate*	x	x	?	x	x		

Dimya dissimilis, *Tate*	x	x	x	x	x		
Pecten consobrinus, *Tate*, var. ...	x	.	.	.	.	Aldinga	
Hochstetteri, *Zittel*	x	.	x	Aldinga, R. Murray			
Murrayensis, *Tate*	x	.	.	x	.		
Peroni (?) *Tate*	x	.	.	.	.	Aldinga	
Sturtianus, *Tate*	x	.	.	x	.		
lucens, *Tate*	x	.	R. Murray, Mioc., Aldinga				
Zitteli, *Hutton*	x	x	x	x	x		
Yahlensis, *Ten.-Wds.* ...	.	x	x	x	.		
dichotomalis, *Tate*	.	x	.	.	x		
polymorphoides, *Zittel* ...	.	x	.	x	.		
Foulcheri, *Ten.-Wds.* ...	x	.	.	x	.		
Lima Bassi, *Ten.-Wds.*	.	x	.	x	x		
Limatula Jeffreysiana, *Tate* ...	x	.	.	x	x		
polynema, *Tate*	x	.	.	.	.	Adelaide	
crebresquamata, *Tate* ...	*	.	.	.	.		
Spondylus pseudoradula, *McCoy* ...	.	x	.	x	x		
gaderopoides, *McCoy* ...	x	x	.	Mitchell R., Aldinga			
Modiola sp.	x	.	.	.	.	Aldinga	
sp.	x	.	.	.	.		
Modiolaria singularis, *Tate* ...	x	.	x	x	.		
Crenella globularis, *Tate*	x	.	.	x	x		
trapezina, *Tate*	.	x	.	x	.		
Nucula Atkinsoni, *Johnston* ...	x	x	.	x	x		
tumida, *Ten.-Wds.* ...	x	x	x	x	x		
Morundiana, *Tate*	x	.	x	x	.		
Leda apiculata. *Tate*	x	x	.	x	x		
Huttoni, *Ten.-Wds.*	.	x	x	x	x		
obolella, *Tate*	x	x	.	x	x		
vagans, *Tate*	.	x	x	x	x		
Woodsii, *Tate*	x	.	x	x	.		
embolos, *Tate*	x	.	.	.	x		
Poroleda lanceolata, *Tate*	.	*	.	.	.		
Limopsis insolita, *Sow.*	x	.	.	.	.	Aldinga	
Belcheri, *Ads. & R.* ...	x	x	x	x	x		
aurita, *Brocchi ?*	.	x	.	x	.		
Pectunculus cainozoicus, *Ten.-Wds.*	x	.	x	x	.		
laticostatus, *Quoy* ...	x	x	x	x	x		
convexus, *Tate* ...	.	.	x	.	.		
Barbatia consutilis, *Tate*	.	x	.	x	.		
crustata, *Tate*	.	x	x	x	.		
celleporacea, *Tate* ...	.	x	.	x	x		
pumila, *Tate*	.	x	.	x	.		
simulans, *Tate*, var. ...	x	.	.	x	.		
interclathrata, *Tate* ...	*	.	.	.	.		
Plagiarca cainozoica, *Tate*	x	x	x	x	x		
Cucullæa Corioensis, *McCoy* ...	x	x	x	x	x		
Crassatella communis, *Tate*... ...	x	x	x	x	x		
Dennanti, *Tate*	.	x	.	x	.		
abbreviata, *Tate* ...	x	.	.	.	.	R. Murray	
Hallii, *Tate*	*	.	.	.	.		
Trigonia semiundulata, *McCoy* ...	x	.	.	x	.		
tubulifera, *Tate*	x	x	.	x	x		
Mytilicardia alata, *Tate*	x	.	.	.	.	Aldinga	
Cardita delicatula, *Tate*	x	x	x	x	x		
polynema, *Tate*	x	x	.	.	x		
compacta, *Tate*	.	x	.	x	.		
scabrosa, *Tate*	.	x	.	x	.		

Carditella radiata, *Tate*	x	.	.	.	.	Aldinga
inornata, *Tate*	*	.	.	.	.	
Lucina araneosa, *Tate*	.	.	x	x	.	
leucomomorpha, *Tate* ...	x	.	.	x	.	
projecta, *Tate*	x	.	.	x	.	
Diplodonta subquadrata, *Tate* ...	x	.	.	x	x	
Verticordia echinata, *Tate*	*	.	.	.	.	
Chama lamellifera, *Ten.-Wds.* ...	x	x	.	x	x	
Cardium psendomagnum, *McCoy* ..	*	.	.	.	.	
antisemigranulatum, *McCoy*	x	.	.	x	.	
ornithopetronicum, *Tate*	*	.	.	.	.	
Chione cainozoica, *Ten.-Wds.* ...	x	.	.	x	x	
multitæniata, *Tate*	x	.	.	.	.	Aldinga
propinqua, *Ten.-Wds.* ...	x	.	.	x	.	
Pritchardi, *Tate*	*	.	.	.	.	
dimorphophylla, *Tate* ...	.	.	x	x	.	
Cytherea eburnea, *Tate*	.	x	x	x	x	
tenuis, *Tate*	x	.	.	.	.	Aldinga
Dosinia Johnstoni, *Tate*	x	.	.	.	.	Table Cape
Tellina Masoni, *Tate*	x	.	.	x	.	
equilatera, *Tate*	.	.	x	x	Mioc.,	Gippsland
Stirlingi, *Tate*	x	.	.	x	.	
Psammobia æqualis, *Tate*	x	.	.	x	x	
Semele Krauseana, *Tate*	.	x	.	x	x	
vesiculosa, *Tate*	.	x	.	x	.	
præcisa, *Tate*	*	.	.	.	.	
Mactra axiniformis, *Tate*	x	.	.	Mioc.,	Muddy Creek	
Howchiniana, *Tate*... ...	x	.	.	x	x	
Myadora tenuilirata, *Tate*	x	x	x	x	x	
Phragmorisma anatinæformis, *Tate*	x	.	.	.	.	Table Cape
Myochama rugata, *Tate*	x	x	.	.	.	
Corbula pyxidata, *Tate*	x	x	.	.	.	Aldinga
ephamilla, *Tate*	.	x	x	x	x	
Panopæa orbita, *Hutton*	x	.	.	x	.	
Solecurtus Dennanti, *Tate*	x	.	.	x	.	
Aspergillum teredina, *Tate*... ...	x	.	.	.	.	Table Cape
PALLIOBRANCHIATA.						
Terebratula vitreoides, *Ten.-Wds.*	x	x	.	x	x	
Waldheimia insolita, *Tate*	x	x	x	x	.	
Corioensis, *McCoy* ...	x	.	.	x	x	
Garibaldiana, *Davidson*	.	x	.	x	x	
Terebratulina Scoulari, *Tate* ...	.	x	x	x	.	
Davidsoni, *Etheridge*	x	.	.	Aldinga,	Table Cape	
Magasella compta, *G. B. Sow.* ...	x	x	x	x	.	
POLYZOA.						
Salenaria rutella, *Ten.-Wds.* ...	.	.	x	x	x	
concinna, *Ten.-Wds.* ...	x	x	.	x	.	
Lunulites petaloides, *D'Orb.* ...	x	.	x	x	.	
Cellepora fossa, *Haswell*	x	x	.	x	.	Rec.
Lepralia edax, *Busk*	x	.	.	Mt. Gambier,	Rec.	
ECHINODERMATA.						
Paradoxechinus novus, *Laube* ...	x	.	.	R. Murray,	Aldinga	
Psammechinus Woodsi, *Laube* ...	x	.	.	R. Murray,	Aldinga	
Scutellina patella, *Tate*	x	.	.	x	.	
Clypeaster Gippslandicus, *McCoy* ...	x	.	.	x	.	R. Mitchell
Monostychia australis, *Laube* ...	x	.	.	.	.	R. Murray
Echinolampas posterocrassus, *Gregory*	x	.	.	.	.	Aldinga
Holaster australiæ, *Duncan* ...	x	.	R. Murray	Cliffs,	Aldinga	

Pericosmus compressus, *McCoy* ...	x	.	.	.	R. Murray Cliffs
Cyclaster Archeri, *Ten.-Wds.* ...	x	.	.	.	R. Murray Cliffs
Eupatagus Murrayensis, *Laube* ...	x	.	.	.	R. Murray Cliffs
rotundus, *Duncan* ...	.	x	.	.	R. Murray Cliffs
Lovenia Forbesi, *Ten.-Wds.* ...	x	.	.	x	R. Murray Cliffs
Astrogonium sp.	x	.	.	.	. Aldinga
Antedon breviceps, *Tate*	*	.	.	.	.
ZOANTHARIA.					
Flabellum Candeanum, *Ed. & H.* ...	.	x	.	x	x
pedicellare, *Tate*... ...	.	x	x	x	x
Victoriæ, *Duncan* ...	x	x	x	x	x
distinctum, *Ed. & H.* ...	x	x	.	.	. Aldinga
medioplicatum, *Tate* ...	*	.	.	.	.
circulare ? *Ten.-Wds.* ...	x	.	.	.	Eoc., N. Zealand
Placotrochus deltoideus, *Duncan* ...	x	x	x	x	.
elongatus, *Duncan* ...	x	x	x	x	x
Notocyathus australis, *Duncan* ...	x	x	x	x	.
excisus, *Duncan* ...	x	x	x	x	.
alatus, *Ten.-Wds.* ...	x	.	.	.	. R. Murray
viola, *Duncan* ...	x	.	.	x	.
punctatus, *Tate* ...	x	.	.	x	.
Conocyathus cyclocostatus, *Ten.-Wds.*	x	.	.	x	.
Trematotrochus fenestratus, *Ten.-Wds.*	x	.	x	x	.
grandipora, *Tate* ...	x	.	.	x	.
bicyclus, *Tate* ...	x	.	.	x	.
Trochocyathus Victoriæ, *Duncan* ...	.	x	.	.	.
meridionalis, *Duncan*	.	x	.	.	.
bellicostatus, *Tate*	*	.	.	.	.
Deltocyathus Italicus, *Ed. & H.* ...	x	x	.	.	.
Conotrochus typus, *Sequenza* ...	.	x	.	.	x
Smilotrochus vacuus, *Ten.-Wds.* ...	x	.	.	x	.
Amphihelia incrustans, *Duncan* ...	.	x	.	.	.
Conosmilia anomala, *Duncan* ...	.	x	.	.	.
lituola, *Duncan*	.	x	.	.	.
elegans, *Duncan* ...	x	x	.	.	.
striata, *Duncan*	x	x	x	x	.
Bathyactis discus, *Ten.-Wds.* ...	x	x	x	x	.
basiporosus, *Tate* ...	*	.	.	.	.
Cycloseris tenuis, *Duncan*	.	x	.	.	.
Balanophyllia australiense, *D.* ...	.	x	.	.	.
Selwyni, *D.*	x	x	.	.	.
cylindrica, *D.* ...	.	x	.	.	.
Ulrichi, *D.*	.	x	.	.	.
campanulata, *D.* ...	.	x	.	.	.
Graphularia senescens, *Tate* ...	x	.	.	.	. Aldinga

Customs, Rites, and Superstitions of the Aboriginal Tribes of the Gulf of Carpentaria, with a Vocabulary.

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(Communicated by E. C. Stirling, M.D., F.R.S.)

The customs, rites, and superstitions of the tribes of natives inhabiting those portions of the Gulf of Carpentaria traversed by the Roper, Limmen, McArthur, Robinson and Calvert Rivers, as well as the islands comprising the Sir Edward Pellew group, differ in a very great measure from those of the more inland tribes. This is attributable to their long intercourse with the Malay trepang-fishers. That intercourse with some foreign people existed nearly a century ago is proved by the records of Matthew Flinders, Commander of H.M.S. Investigator, who, during his survey of this coast in 1802, speaks of the existence of relics left by such people on the Sir Edward Pellew group of islands. Probably these were Malays, who still visit our Northern coast every year for the purpose of gathering trepang. It is not my intention to go further into the history of these Malays or their trepang fishing, as the subject has been fully treated by Mr. Alfred Searcy, Sub-Collector of Customs at Port Darwin; but I briefly mention this fact, as I shall show further on that some of the peculiarities of these particular tribes are due to long intercourse with a foreign people. I have had great opportunities of studying the customs and idiosyncracies of the native tribes of Northern Australia, having been a resident in its tropical region for twenty-three years and, since my residence in this particular locality, I have been much impressed with the importance of writing a record of them; although incompetent to do so myself, I shall have very much pleasure in assisting in the research. I have appended hereto a long list of the various tribes on, and about, the before-mentioned rivers. The dialect used in all cases is that of the tribe located at Borroloola, this being the native name of this township, which is situated on the west bank of the McArthur River, and southwards from the coast about fifty miles. The name of this tribe is Leeanuwa.

The Malay cast of feature is very pronounced, and there are at the present time several half-castes. The face is much sharper than that of the usual native type; the flat nose, so characteristic

of the Australian aboriginal, is very rarely seen, and his characteristic cunning and braggadocio has with these become more strongly developed than in the more inland tribes. Vanderlin Island, the largest of the Pellew Group, is the *rendezvous* of a most determined and bloodthirsty people, who have already become notorious for the murder of several white persons on this river. I am quite willing to admit that some of the murders committed by aboriginals have been brought about by the victims, but many of the tribes with which I am now dealing will take bread from you with one hand, while they murder you with the other. They will resort to all sorts of schemes and devices to lure you from your camp, even to the offer of their women; they will then rob your camp, and you will be extremely lucky if you escape with your life. I would like to relate an instance that occurred to a party coming overland from Burketown, consisting of three white men and a young Queensland black boy. At about 5 p.m. they camped on the Calvert River. Soon afterwards, while they were having their tea, two blackfellows came up, and gave them to understand by signs that there were two horses on a small creek close by. Two of the party went to look at these horses, leaving the other white man and the black boy in the camp. As soon as the two men were sufficiently far away to be out of hearing, about twenty natives, all having a number of spears, rushed into the camp and attacked the white man and black boy. However, the man was able to get hold of his repeating rifle, and after a few shots drove them off. At the same time some shots were heard down the creek, and the two men, hurriedly returning, explained that they also had been attacked, while they could see no sign of any strange horses. The party then immediately saddled up, and travelled on all night. This is only one of many instances in which the natives have tried, and in some instances with success, to lure the unwary traveller to his doom. I do not suggest that the aboriginal is always to blame, but the cases in which the white man brings the punishment upon himself are few and far between; and I wish merely to show how cunning they are in some of their subterfuges.

The Vanderlin tribe are expert canoeists, and are possessed of some very fine canoes, made out of solid trees, which have been left there by the Malays. They are particularly fond of tobacco and arrack (a kind of white rum), are extremely superstitious, and many of their corroborees are reiterations of deeds of prowess performed by their ancestors, in which, of course, nothing of the heroic is lost. One corroboree (a favourite) is descriptive of a large snake that appears every year, generally about the first heavy rains, and takes away an old man from

the tribe. This snake only appears to the old people and, as soon as it is seen, an old man dies and mysteriously disappears. Of course, out of the many tribes it is more than probable that an old man will die every year. As soon as the fact is known by the other tribes their cry is "Yes, snake take him."

I have frequently tried to obtain from the young and more intelligent natives a reason for this illusion, but they persistently believe it to be true and nothing will shake that belief. It is not generally understood that the chanting of past records, such as of any wonderful or startling event, is customary with the Australian native, and I am quite of opinion that it is only among some of these Gulf tribes that such is the case. Perhaps the reason is not so difficult to understand, when it is known that some of the native races of the Celebes Islands, who have no written history, chant their past deeds, and so hand them down to posterity. May not this custom have been instilled into the minds of these tribes by the visits of the Malays to our northern seaboard? Another corroboree, relative to the approach of the white man, is sometimes performed.

No much lower race of human beings exists than the Australian aboriginal. Although he is capable of improvement, he is more than apt to go back into his wild state, to whatever extent he may have become subject to the influences of civilisation. We have instances in this locality in which boys have been taken up by Europeans, taught to read and write and treated in every way as the equal of a white man, yet they have eventually returned to their tribes. In the case of the late murder of Clark and Dolitte at Bowgan, the ringleader of that dastardly and inhuman outrage was a young blackfellow named "Box," who had lived with Europeans for over nine years.

I will now to the best of my ability state such information as I have to offer concerning the Gulf tribes, in a form suggested by a detailed set of "Questions on the manners, customs, religion, superstitions, &c., of uncivilized or semi-civilised peoples," by J. G. Frazer, M.A., Trinity College, Cambridge, which was supplied to me by Dr. Stirling. The numbers in the text are those of Mr. Frazer's questions, and they have been retained for convenience of reference and comparison.

Tribes.

1. The natives are divided into tribes consisting of a chief and from 60 to 100 souls; they are not subdivided again into clans or castes. For the names of tribes and individuals see appendix.

2-3. The only difference in dress is the mode of wearing the hair, that is when any attention is paid to it at all, which is seldom.

Nearly all the tribes I am now dealing with plait the hair into a conical form, with string made from the fur of the opossum. The tribes further inland leave the hair very bushy, and ornament the forehead with kangaroo teeth, which are attached to the hair. The covering of the private parts is nearly the same throughout Australia; with these tribes that of the male is called "Woocarrala," and that of the female, "Mada Madda"; these are also made from opossum-fur. On very special occasions they wear necklets made of short lengths of grass-stems threaded like beads.

4. They do not take their names from animals or plants, and they cannot tell how, or from what, their names are derived; but, as with us, many water-holes, and particularly camping places, are named after chiefs or other notable men of their tribes; for instance, Bindawadgie is the name of a member of the Leeanuwa tribe and a large camping place is named after him. When a child is born it takes the name of some dead relative or friend of the same tribe, and sometimes a name is manufactured from portions of other names. They will not eat the flesh of the crocodile, not on account of it being held sacred, but because they believe that if they eat it they will waste away and die. The flesh of the crocodile is certainly not very tempting and the odour is extremely offensive.

5. They will not, for the same reason, even touch its bones.

6. They assert that their tribes originate from a monstrous native whom they call "Gnabya," and in their lamentations the refrain of "Gnabya! Gnabya!! Gnabya!!!" is frequently heard; but beyond this it is but very seldom any reference is made to him. It is generally the very old women who are loudest in this refrain, and they will keep it up with a dirge-like monotony for twelve or fourteen hours until thoroughly exhausted.

Birth, Descent, Adoption.

7. At the birth of a child the mother is always assisted by her mother or some near relative. At the approach of delivery she retires into seclusion and remains there until a few hours after the birth; the after-birth is buried immediately, as they have a very strong superstition that if it be eaten by a wild dog the child also will be eaten by dogs. The umbilical cord is tied with fibre, generally very close to the navel; it is then severed with a sharp piece of flint, and the infant is wrapped in "paperbark" (*Melaleuca Leucodendron*). No ceremony of any kind at birth is observed.

8. During pregnancy no difference in diet is observed until after quickening; very little meat is then taken until about ten days after the birth of the child. The mother subsists during

that period entirely on roots, berries, fruits, &c. There is a kind of wild parsnip, of which the natives are very fond; this, if in season, is eagerly sought for during the first few days after child-birth. A few hours after the child is born the mother walks about apparently as strong as ever. The number of days she remains away from her husband depends a good deal on the number of his wives.

9. The husband makes no difference in his mode of living either before or after the birth.

10. The father always names the child, but without the slightest ceremony. Usually it is called after some dead relative, and it is very seldom that a name has to be manufactured. No two children bear the same name.

11. In the case of the death of an elder brother or sister they will give the name of the deceased to a child just born, the naming taking place as soon as it is born, but without ceremony.

12. It is a common occurrence to kill the firstborn, irrespective of sex. The fact that the child has been killed is not always known to the father, and he takes no trouble to enquire into the matter; in the mother extreme youthfulness is one of the reasons for killing the firstborn. If the birth has been a painful one, the mother will herself sometimes kill it; and if she be too weak, it is often killed by the attendants.

13. The child always takes the name of the father's tribe, and belongs to that tribe; but if the child be a female, and having been stolen by another tribe marries one of its young men, she of course becomes a member of it.

14. Adoption is largely practised, and in the case of the adoption of a female child, she is at the disposal of the foster mother, who generally gives her to some young man of the tribe in exchange for some ornament, trinket, or food. No ceremony accompanies the adoption. If it is a boy, he manages to get food as he best can, though while he is a baby he is cared for as much as the girl. The boys, however, get very little meat until they are able to obtain it for themselves.

Puberty.

15. The only ceremony of any very great importance is performed at puberty, and is always carried out with great pomp and ceremony. I will endeavour to describe the ceremony as observed by myself. A camp or open space, which I will call "the circle," is cleared to a diameter of thirty yards and swept quite clean. Half of "the circle" is fenced round with bushes, on the inner side of which are seated the councillors or leaders of the ceremony, the chief being in the centre of them. None of the women or children are allowed near "the circle," but are camped some two

or three hundred yards away. At about 7 p.m., or as soon as the moon is well-up (these ceremonies are always performed during full moon), a weird cry is heard in the distance. All in the vicinity of the circle are still as death; the plaintive cry, which much resembles the shriek of the stone-plover, continues and as it approaches nearer the chief in a low voice now and then commands silence. After about ten or fifteen minutes, between thirty or forty warriors, painted and most gorgeously arrayed in head-dresses of emu-plumes and other fanciful coverings, advance from the direction of the cry, and from the midst of these advancing warriors one of the fleetest darts forward towards the circle, and at every thirty or forty yards falls prone to the earth, with his ear close to the ground. This is repeated until near the circle, when he glances hurriedly at the seated figures and rapidly returns to his fellow-warriors, with the assurance that all is right and everything is ready for the ceremony. The warriors then advance in a compact body to the centre of "the circle," seating themselves face inwards and with heads bowed to the ground. One of the guardians from beneath the brush-shelter then approaches these warriors, and with a piece of yellow ochre makes a cross on the backs of about half of their number, thus indicating the individuals who are to seize the boys that are to undergo the rite. In the meantime the elderly men who have charge of the boys are seated on the convex side of the brush-fence. A corroboree is now commenced, in which the women in their camp take part. This corroboree, or chant, has no reference to the ceremony; but its purpose is rather to divert the attention of the boys from the ordeal that awaits them. I was informed that the boys did not know what was to be done to them; but from their abject looks I am inclined to think that they must have had some idea. On the whole, however, they behaved very well indeed. No young boys or girls are admitted within sight of "the circle," but are compelled to remain in the camp with the old women, while the corroboree still goes on, with a dirge-like monotony, until very near daylight. Suddenly all are startled by the chief, who, in a loud voice, demands the boys from the elderly natives, and commands the yellow-cross warriors to seize them and bring them into "the circle," one of the elderly men accompanying each boy. On entering "the circle" a yellow-cross warrior drops on his hands and knees, another throws a boy across the kneeling warrior's back, and one of the old men advancing with a piece of sharp flint called "Boorawa," takes the end of the foreskin between the thumb and finger and cuts the end off, which he places on a piece of paperbark. He then takes the penis between the thumb and forefinger, turns it up, and slits the urethra close to the back

part of the foreskin. Some of these slits, being clumsily done, extend nearly the whole length of the penis; while others form only a small hole, which sometimes has to be enlarged. Through this slit they always pass their water. The pieces of foreskin are taken away by the old men and thrown into a waterhole containing lilies. This is done to prevent the young men from becoming ill after the ceremony, which, indeed, so seldom occurs that the fact of throwing these clippings into a waterhole is considered a preventive beyond dispute. Each boy is then presented with an outfit—first with a covering for his person, and then with the various implements used in war or in the chase. No dressing whatever is used after the operation, and the wounds appear to heal very rapidly. The object of performing the ceremony at daylight, or shortly before, is to prevent any of the young people knowing anything of it, and this is the only occasion in which any kind of decency is shown to the younger members of this strange people. The night after the ceremony, and for several nights following, a grand corroboree is performed, and it is during these latter orgies that the young men are allotted their wives—that is, so far as those are available for them; but, as subsequently stated, they generally obtain their wives from other tribes by stealth or capture.

While on this subject, I will describe a corresponding operation which is performed on the young gins (23), and with the same instrument. Formerly, that is, previous to the advent of the white man, it was accompanied by a similar ceremony to that above described, with the exception that the women took the part of the yellow-cross warriors and of the elderly men in charge of the boys. Young men, girls, and boys were not allowed near "the circle" when the rite was performed. Now, however, it is done without any ceremony. It is a most brutal and inhuman ordeal, and the natives seem to have an idea that if conducted with any pomp or display civilisation would not tolerate it. It is now conducted as follows:—An old man, generally a relative other than the father, takes the poor girl, without the slightest warning, into seclusion, and with the piece of flint previously described enlarges the opening of the vagina; this operation, brutal in the extreme, must be, indeed, very painful, as the cries are described by my interpreter as sometimes dreadful to hear. No white men, of course, would be permitted to witness these ceremonies, even were they inclined to do so. The object of this operation is to enable the male to have easier access; and this may have relation to the fact that, in consequence of the operation performed on the boy—I refer to slitting the urethra—the penis when erected has a downward curve. A number of young girls are now escaping this brutal ordeal, as

also are a fair percentage of young men, so that it will probably, in a few years, become a thing of the past. With regard to the operation performed on the young men, I have been very particular in obtaining all possible information as to the reason of the male rite, and am convinced that it is done purely for the sake of cleanliness and not, as I have frequently heard, to prevent procreation. To convince me that I was wrong, a friend of mine in this district said, "Now we will go into the natives' camp, when I will satisfy you." On arrival there, he selected an intelligent young native, and said to him, "By-and-bye you cut him Dyimboo (penis), you no more make him Leeardooberrie" (children). The reply was, "Yah (yes); no more make him." I objected to the manner of putting the question, and, in my turn, said to the native, "Suppose you cut him Dyimboo; you no more get him sore fellow?" The reply was, "Yah; no more get him sore fellow." So that one has to be careful, and not rely too much on leading questions. My interpreter knows thoroughly well now what my object is in putting all these questions; but even with him I never lead directly up to a subject.

16. The pretence of killing, and then of restoring life, is not practised with these tribes; although if a young person dies, they all get round the body and try to keep it warm.

17. After the initiatory rites, the boys are allotted wives, but they do not have sexual intercourse with them until one moon, or month, after the ceremony.

18. Some of the tribes knock out the front teeth in the upper jaw, and all of them pierce the cartilage of the nose; these mutilations are performed without any ceremony. During corroborees a stick is inserted through the nose, simply as an ornament.

19. After the young man has quite recovered from the operation performed at puberty, he is marked and scored with a piece of flint across the chest; this is generally done by the young wife, and he in turn marks her in the same way. Sometimes the wounds are made on their own persons, and it is wonderful the amount of misery and pain they will bear in order to be in the fashion; perhaps they are not peculiar in this respect; however, they consider it more manly to have these marks, and it would be impossible to find an aboriginal without them. Young couples will pass the greater part of their time in adorning each other. He makes necklets for her, and she makes armlets for him.

20. Any person is competent to put on these marks. You may sometimes see a broad-arrow on a blackfellow, put on by a white man, with, of course, the consent of the native. I have seen the resulting cicatrices standing out quite an inch from the ordinary surface of the flesh.

21-23. Both sexes are marked alike, and, so far as I know, the markings have no significance beyond show.

24-26. A girl is secluded at her first menstruation, during which she sits on a piece of "paper-bark" in her mother's camp, but they are not secluded at subsequent periods. During their courses they observe no particular rules, except that, if they are sick or very weak, they are then rubbed with Eucalyptus leaves made hot over the flame of a fire. In assigning a cause for the flow they simply say that Gnabya *(vide* 6*)* makes the blood come every moon, and that in a few days he will stop it again. Although a most brutal and inhuman race of people, they possess a very wholesome dread of having sexual intercourse during menstruation, and positively assert that any man so doing will become covered with sores; but, as stated, she is not secluded after the first period; at subsequent periods she may be seen and conversed with, and she is merely looked upon with compassion.

Marriage

27. A man is not allowed to marry any of his own tribe unless it is very clear that no blood relationship exists, however remote.

28-29. Young men and women have sexual intercourse without marriage, and if the young woman becomes pregnant the young man is compelled to take her as his wife. If a man cohabit with a woman already married, and her unfaithfulness is discovered or even suspected by the husband, she is beaten most unmercifully, and sometimes deliberately killed, without interference with his brutality to his wife. Sometimes he gives her away to a polygamist, which is considered a great punishment. A male adulterer, if unmarried, is banished from the tribe until he can capture or obtain a wife from some neighbouring tribe.

30. They are very strict with regard to the degrees of consanguinity, and will not permit the marriage of blood relations, however remote; but they allow a man to marry his deceased wife's sister, or a woman her deceased husband's brother. A young man, son of a captured woman, who captures a young woman from his mother's tribe must be very careful to find out that she is not a relative, or he will not be allowed to have her.

31-32. Polygamy is extensively practised, but polyandry is unknown.

33. The reason they assign for having more than one wife, is that they will be better supplied with honey and other edibles, the procuring of which is among the duties expected of the women. Where there are a number of wives living together in this way, there are never ending fights and squabbles, so that a surfeit of connubial bliss has its dark side. The husband never

takes more than one of his wives when on a hunting trip, but takes them in turn. Those who remain in the camp, procure honey and roots in the near neighbourhood, ready for the husband on his return. They also collect a quantity of lily seeds which they pound up on a flat stone, and with the flour make a kind of "Johnny cake."

34. A man obtains his wife generally by capture, but sometimes the wife-seeker is allowed to come into camp to select a wife. It is considered far more manly and heroic to steal the wife, and she prefers this mode of being wooed. On the death of a man whose wife has been captured from a distant tribe, the widow is given to another man of her late husband's tribe; but if possible, she contrives to be stolen by a member of some tribe not originally her own.

35-36. On capturing a wife, the husband takes her to his country and home.

37-39. No ceremony whatever is observed at marriage, and the bride is not veiled, nor is she ever represented by a dummy or proxy.

40-41. There are no bridesmaids or best men, nor is there any ceremony on the day after marriage.

42-43. As there is no marriage ceremony, the man cohabits from the date of capture without allowing the lapse of any fixed period; and the custom does not exist of visiting the wife by stealth. In the case of a newly-married man, he is always with her.

44. It is neither required nor permitted that the wife should be deflowered or have sexual intercourse with another man before her husband.

45. Men abstain from cohabiting with women during menstruation, for the last few days of pregnancy, and for about ten days after childbirth.

46. Wives are sometimes exchanged and sometimes given away, and a widow is free to marry whom she chooses. Sometimes a woman objects to be mated with a certain man, but as a rule, in their opinion, one man is as good as another.

47. A woman may look at and speak to her father-in-law, but a man may not look at or speak to his mother-in-law, or his wife's relatives. This is a custom that I have never seen so persistently carried out as it is with these tribes. A man passing a camp in which are seated *any* of his wife's or wives' relatives, will shroud his eyes, and, in fact, go considerably out of his way to avoid seeing them. I have noticed this particularly in the case of my interpreter. His wife's father and mother are always in this township, and on several occasions I have employed the old man to cut wood and carry water, &c. On one occasion I was

engaged at something in which I received the combined assistance of my interpreter and his father-in-law; but during the whole of the time the young man kept his head turned away from the old man, and would not for any consideration speak to him.

48. Brothers and sisters may both see and converse with each other.

Disease and Death.

49. When any of them become sick they suppose "Gnabya" is angry (6), and they attribute the cause of death also to him. I must admit that I have had some difficulty in getting information relative to this subject. Without being able to explain it they seem to have some idea of the mystery of death, but very few of them will converse on the subject.

50. Nearly all complaints are treated in the same manner, that is by continually rubbing the affected parts with the inner bark and leaves of a Eucalyptus tree, heated over a fire. About two years ago influenza broke out among the natives here, and I have witnessed, with very great interest, this practice of rubbing the body with Eucalyptus leaves. The patient lies, face downwards, close to a slow fire. The doctor, or operator, also sits close to the fire, with a large heap of leaves close at hand. He keeps up a continual rubbing of the body with these leaves heated over the fire, and from this treatment they appear to obtain great relief. In cases of venereal disease, the person suffering will go into very muddy water and remain there for hours, and apply clay to any open sore. During the cold season they are covered with ringworm, which they cure with applications of a solution made of the dark gum that exudes from the gum-trees; but they are not particular about getting rid of the eruption, and pay very little attention to its cure. For rheumatic pains the bleached bones of a kangaroo, pounded to a fine powder and rubbed on to the affected parts, are considered to be a certain cure.

51. They think that "Gnabya" makes them unwell, but beyond the lamentation of "Gnabya! Gnabya! Gnabya!" there does not appear to be any further appeal to him for relief or assistance in any of their troubles.

53. On the death of a native, his relatives assemble round his body and, as soon as they are assured of his death, they beat themselves about the head with sticks and sharp stones until the blood streams down their faces, old men and women crying aloud like children. After a time, when the mourners have modified their grief, four male relatives or friends will enfold the body in many wraps of "paper-bark," and they then prepare a staging or platform among the branches of a fairly-well shaded tree, on which they place the body, where it remains until all the

flesh is off the bones. The bare bones are then collected and placed in a hollow log about five feet long and ten inches in diameter. The ends of this are closed with pieces of "paper-bark," and the coffin is placed between the branches of a tree, well secluded and away from their own haunts. Rocky ravines and almost inaccessible places are invariably chosen as the last resting place of the bones. At this final burial rite a great corroboree takes place, varying in pomp according to the importance of the departed. If he has been a great warrior, all his brave deeds are then recounted, and he is immortalised by a special corroboree made for him; and thus his history and deeds are handed down. Very little notice is taken of the death of a woman.

54. Ghosts of the departed are generally believed in, but while there is any flesh on the bones of the body recently placed on the first tree, there is not the slightest fear of the ghost appearing; but immediately the coffin is placed in the secluded spot, or, in other words, as soon as the flesh is all off the bones, the ghost is liable to appear, and it is only at this time that it is seen. When the ghost appears, the four men previously mentioned, if living, remove the bones into the camp. If the ghost follows, it is commanded by the old men in a corroboree to leave, which it does, and is not again seen. If one of the four men happens to die between the death of his friend and the seeing of the ghost, his body, if not too offensive, is brought into camp and is considered a certain remedy against the appearance of the ghost of any person dying at that time. If they dream of a ghost or any uncanny object, they believe they have absolutely seen the ghost and act in every way as if they had. After the disposal of the ghost, the bones are taken to another place.

55. The persons engaged in the burial rites start a monotonous dirge and continue it until the ceremony is over; and, even for weeks after the death, they are apt to break out in the melancholy refrain. If a near relative happens to be away, when the death occurs, and comes into camp a month after, he will begin howling like a wild dog. I have frequently been compelled to send them word to desist.

56-57. Neither the widow nor relatives have any special observances after the death of a warrior, and they wear nothing *in memoriam* beyond what has been related. There are no other special customs or superstitions concerning the bones of the dead.

Murder.

58. A murder is avenged by the relatives of the victim; in fact, all members of the tribe are commanded to avenge the death. All members of the murderer's tribe are responsible, and any of them falling into the hands of the relatives of the victim are put to death without any recognised form.

59. They will accept no compensation, but will be avenged. Of course mistakes are made, and sometimes the murder goes unavenged; but they are like blood hounds when once on the track.

60. A murderer is not considered unclean; but, with his own tribe, he is rather made much of. A murder, as they understand the term, is not of frequent occurrence.

Property and Inheritance.

61-64. After the death of a chief, his eldest son assumes the position and, if he should not have arrived at puberty, an old warrior is selected to act until the son has gone through the ordeal. Even then he has very little power, and very little attention is paid to him until he has proved himself worthy of the position. They have no property, except the piece of country on which they were born. The installation of a new chief is always a ceremony of importance. A circle is formed, as in the case of the ceremony at puberty, and the chief-elect is led into the circle, with his head completely covered. All those in attendance (no women or children are allowed) begin a corroboree, first chanting the many good qualities of their old chief, and gradually coming round to the many things expected of the new, who is then and there acknowledged to be their head man. He is presented with a "Narleega" (throwing stick), which is carved and painted very gaudily. The newly-made chief is then uncovered. He assumes command, and orders a corroboree and dance, which is continued all night. He wears no distinctive dress, and a stranger would not know who was the chief.

Fire.

65. Fire is obtained by friction of one piece of wood against another. The horizontal piece is held under the foot, while the perpendicular piece is twirled quickly round between the palms of the hands with a downward pressure. As soon as smoke is observed, the operator takes from his hair (kept there for the purpose) a piece of wax mixed with fat, about the size of a pea, drops it into the hole made in the horizontal stick, and again twirls the other stick round, with the result that a fine smouldering powder is produced, which, being shaken into dry grass or bark and vigorously blown, soon kindles into a flame. I have seen them produce fire in two minutes.

66. Fires are never extinguished, unless it is to throw pursuers off the track; on the other hand, they will, if very closely pursued and the country is dry, light fires all round to burn the grass, and get away unseen in the smoke.

67. They have no superstition about fire, or story of its origin.

Food.

68. They eat almost everything in the shape of animal food. Crocodiles *(Crocodilus porosus)* are the only reptiles that they will not eat, and they would rather resort to eating each other than touch their flesh. The much smaller Gavial (*Philas Johnstoni*), found on fresh-water lagoons and at the heads of the rivers, is quite harmless, and of its flesh the aboriginal male adults are very fond. They believe that if any of them eat the flesh of the large crocodile, they will pine away and die; and I know of no tribe amongst which its flesh is eaten.

69. Men and women eat together seated round the fire.

70-71. Children eat with their parents, except when they get shell-fish. These they cook and eat by themselves; but in the case of game or fish being brought in, the women do the cooking, and the children get their share.

72-75. Cannibalism is practised among some of the tribes. They sometimes eat a child that has died, but they never kill a child to eat the flesh; and it is only in the case of the death of a young boy or girl that they practise cannibalism. Adults they do not eat, and the mother of a child never partakes of its flesh—in fact, neither women nor children practise it at all, and male adults only when they are extremely hungry, and cannot get animal food; even then it is done in a stealthy manner, and with as little show as possible.

76. The bones of a child that has been eaten are given to the mother, who carries them about with her for some considerable time, in order to prevent the anger of "Gnabya," or the ghost of the departed child, who visits the camp. After the mother thinks she can deposit the bones in safety, she will do so by putting them into a hollow log, and placing the same in some secluded tree or cave.

77. Immediately on killing a kangaroo they sometimes drink the blood.

78. In the case of the flooding of a woman, they will not even look at her; but this very seldom occurs, and is the only instance in which blood is abhorrent. Women have no objection, or are they forbidden, to see the blood of men.

79. Fasting is only practised when want compels. If they suffer from indigestion, they start a corroboree and dance.

80. The omental fat of the kangaroo is eaten by the slayer, and a portion of it rubbed on his body; this is supposed to strengthen the sinews. Women are forbidden to eat flying foxes *(Pteropus)*, for if they do so all the flying foxes will leave the locality. They have no idea that they will acquire the qualities of certain animals by eating their flesh.

Hunting and Fishing.

81. Their principal way of catching fish is by staking the mouth of small salt-water creeks during high tide, and filling the spaces between the stakes with grass; in this way a great number of fish are caught. On large creeks the bars, or junctions of fresh and salt waters, are favourite fishing places. The Vanderlin Island tribe are most expert canoeists, and with the dugong-spear they can capture any number of these animals.

82. No special custom is observed in hunting and fishing, except absolute silence, all communications being made by signs. A big corroboree generally succeeds a successful hunting tour.

83-84. The women and children left at home during the absence of the hunters gather honey, fruits, &c.; and there are always a few men left in the camp, in case of a surprise by any neighbouring tribe. On returning from the chase they generally have a big dance, and the hunter who has been most successful is decorated with kangaroo teeth, which are hung round his forehead from the hair.

85. No ceremony is observed with regard to the animals slain. They burn the bones—that is, if their dogs leave any about the camp. They always have a lot of dingoes with them, and it is quite common to see a native woman suckling a young pup; they are, in fact, quite as fond of their dogs as they are of their children, and if one of the former is killed or dies, they make a dreadful row. They also put the dead dogs into the branches of a tree on a stage, but after that pay no attention.

Agriculture.

86-96. They do not till the ground, and agriculture is not attempted in any shape or form. They will even without thought or care destroy their best fruit-trees.

War.

97. No ceremony is observed before going to war. It is rather amusing than otherwise to watch a conflict between two tribes. I have seen some terribly hard knocks given, but as a rule there is far more talk than anything else. When there is any serious difference between two tribes, they meet on an open space. A warrior steps forward armed with waddy, throwing stick and two or three spears, struts about and works himself into a most furious rage; another warrior on the opposite side at the same time goes through the same antics; and presently one of them, having arrived at the proper pitch of passion, throws a spear, or the two warriors will drop their spears, and come to close quarters with their waddies. When one of them is knocked down or gets his waddy broken, the row is all over; but if spears are

resorted to, the fight will last longer, and perhaps several may be wounded; but as a rule, as soon as one is hurt, the fight is over, and they then become friendly and chat together.

98-101. There is no special rule as to diet for fighting-men on the war-path, and those who remain in the camp gather honey, fruits, roots, berries, &c., for the warriors on their return. This is an occasion for holding a corroboree, which varies in importance, according to the amount of success gained. Slain foes are not mutilated.

102. On killing an enemy the victor does not observe any special rites, but he is looked upon as a great warrior and feared by his friends. Those killed in battle are buried with rather more pomp than at an ordinary death, their names and deeds being specially mentioned at their usual corroboree after the bones are deposited in their last resting-place. Even when they are not victorious a corroboree is held. The ghost of a warrior killed in battle never appears; this is because "Gnabya" is satisfied with his deeds. Any individual who has distinguished himself in the engagement is made the hero at the corroboree, and his name is mentioned in all corroborees of a warlike character; he is also presented with a set of war implements.

Government.

103. They have no definite form of government. The chiefs have very little power beyond directing wars or conducting ceremonies.

104. The chieftainship is hereditary only as far as sons and brother's sons are concerned; failing such heirs, a new chief is elected from the elder members of the tribe who have distinguished themselves. The chieftain has no badge or anything special about him whereby he may be distinguished.

Oaths and Ordeals.

105. No ceremonies are performed in meeting friends or in forming new friendships. The question of making friends is quite foreign to them, that is as we understand the term. They fraternise with individuals or near neighbours, but a fight may occur on the slightest provocation. In the case of a stranger trespassing on the country of distant tribes he is warned-off at once, and he will be fortunate if he be not treated as a spy and killed. Since the approach of the white man all this is disappearing, and the natives of any part of Australia can travel among most of the tribes without much fear of being molested. Nevertheless, there are a few tribes at the present day that will kill any stranger, white or black, that trespasses on their country.

106. They have no special forms of oath, and will make all

sorts of promises, which they break without the slightest compunction; for instance, an old native will say to a young one, "After two moons I will give you that girl;" but long before that time he will have given her to someone else, and in this way fights are often brought on.

Salutations.

107. They use no form of salutation, except when one of their tribe has been absent for some time, say two months. On his return the members of his tribe will all start crying, and behave in a very similar manner to that in the case of a death. As in grief so in joy. The mother of the returned warrior and the other old women will knock their heads with stones until the blood streams down their faces.

Arithmetic.

108. They count up to five, viz., "Yarcoola" (one), "Kinemadda" (two), "Gnarloo" (three), "Leejallija" (four), "Leejakadda" (five); in describing any number after five, they repeat the last number with the addition of the latter part of number one thus:—"Leejakadda-coola," the greater the number the greater the emphasis on the portion of the word *coola*. They speak so very rapidly, and run all their words so much into one another, that on hearing them describe or name a large number you would only catch the sound "Lakicoola."

109-110. They only use the fingers to denote numbers when they are making signs to the deaf and dumb, or in the chase, when the sound of speech would scare the game, and they never use pebbles or sticks in counting.

111-112. They take the number five from the fingers of the hand, and very often instead of saying "Yarcoola" they will hold up one finger; or two fingers for "Kinemadda" and so on; but they have no name for any number beyond five except "Leejakadda-coola," which means many.

Writing.

113. They send messages and profess to be able to understand them. I have, in travelling over the district, often carried "Yabber-sticks" for the natives; but it is generally done in this way:—The person wishing to send a message will prepare a "Woonda," and hand it to the messenger with this message, "You give this 'Woonda' to 'Bindawadgie,' and tell him to send me some boomerangs and string. Half circles and angles indicate boomerangs, and crosses denote hair-string; this string is twisted with a "Narmarlindee," a cross-like arrangement of two thin sticks.

Measurement of Time.

114-117. They refer to the number of sleeps to indicate days, to moons for months, and to seasons for longer periods. In conversation they will say, "I am going away for two sleeps" (two days). "I shall not return for one moon" (one month). "It will be 'Meewidgie' (wet season) before I return." The time of day is reckoned by the sun, and they take notice of the phases of the moon. All their principal corroborees, for instance, are held on the night when the moon rises at the same the sun sets.

118-120. They determine the seasons by the ripening of fruit, and by the changing of the monsoons; but they have neither names for the different months, nor have they a conception of the lunar or solar year.

121-123. They note the change of the monsoons; the south-east sets in about May, and they know then that the wet season is over. The north-west monsoon sets in about October, and they are then on the look out for the wet season. Their ideas on this subject may best be explained by the description as given by my interpreter:—"First time rain come on, we call 'im 'Meewidgie.' By-and-bye rain go away, cold fellow come on; we call 'im 'Ramardoo.' Then dry fellow come up, we burn 'im grass; we call 'im 'Warrema.' Then big fellow hot come on; we call 'im 'Gnardya.'" So that it would appear from this that their new year comes with the rainy season, say in October or November. Nothing whatever in the shape of a time-keeper is kept by them.

Games and Dances.

124. The young people amuse themselves with small grass spears, blunted at the end. Young men have a game they call "Bowitgee" (going about). A ball is made of paper bark, firmly tied round with string, and about the size of a tennis ball; there are no definite rules for the game, which simply consists of throwing the ball from one to the other very rapidly, and it is wonderful what a time they will keep it going. A young fellow will often just touch the ball, and make it glance off to the next man. A terrific yell of derision greets the unfortunate one who lets it drop. They show, however, a great deal more zeal and attention to their mimic war, which they carry on with the grass spears. This grass may be from four to eight feet high or more.

125. A very popular dance with them is to form a square, opposite sides of which advance, keeping time by stamping heavily on the ground; on meeting in the centre, each side raises the right hand high above the head, and exclaims "Yi!" altogether in a high falsetto voice; they then retire to their places, and the other sides advance in a similar way. The

women supply the music by singing a kind of marching tune, and at the same time by striking one piece of hard wood against another. A few old men also keep time by striking one boomerang against another. Their dances are never of the nature of a religious rite, nor do they in them imitate any animal. Some of them are very disgusting.

Magic and Divination.

126. They assert that they are able to produce rain and practise the following method :—An old man, generally the chief or some one deputed by him, strolls quietly away from the camp, singing in a low humming kind of tone "Gnabya, Gnabya; Wyarrie, Wyarrie" ("Gnabya" is the spirit or ghost; "Wyarrie" is water). He then goes into a waterhole, whilst muttering the above words, dives and stays under water a considerable time, still repeating the same words; he then strolls back to the camp, with head bowed down, and never venturing once to look up. On his arrival in the camp, he declares when the rain is to come, and it very often does come. They will not attempt to predict or make rain until there is almost a certainty of a shower. If a heavy storm comes on, and they have had no hand in it, they declare that some chief of a distant tribe has sent it; and if they should not require rain at that time, it will probably cause a hostile meeting, unless the chief of the suspected tribe says it was some other chief further on that made the rain. This, however, he seldom does, as he is only too proud of the distinction of being able to annoy his enemies, and will rather fight than deny the impeachment. They also profess to be able to stop the rain, but I know, to my great discomfort, that in this they are not to be relied upon. I was out with a young blackfellow on one occasion, when a heavy storm was seen approaching. I said, "You think it rain come up, Charley?" He said, "My word, I think it big fellow come up. Me kill 'im?" I said, "Yes, you kill 'im." He dismounted, and gathered a wisp of straw, and after making water on it, shook it in the face of the approaching storm. He then mounted and we rode on, and in about ten minutes we were thoroughly drenched! I chaffed him about killing the rain, and he was sulky all day.

127. There are no professional magicians, sorcerers, doctors medicine men, or witches among them. Some of the old men profess to be able to cure diseases (*vide* 50).

128. A few of the old men are selected to attend to any one that is ill, but as a rule Nature is the only attendant. Only a few days since there was a terrible fight between the gins, which was thus brought about :—"Bindawadgie" is the possessor of three or four gins (females). "Ghepangarra" stole one of them

—"Moogrubinna" by name—and brought her into the township, she being a party to the affair, as she did not like "Bindawadgie." On arrival in the township, the runaway gin camped with a few others, when one evening she was pounced upon by "Mootokobinna," a sister of "Bindawadgie," assisted by several other women, and the consequence was that they nearly killed her. I have been attending to her since the fight, but not having much confidence in my skill, she has gone to the camp to be treated by her friends. I went this morning to see her, and found her in the camp groaning, without any one to look after her, until I then got some of the old women to do so.

129-132. If a native chief should be very angy with another tribe, he will "make thunder and lightning" by retiring to a cave, or a very secluded spot, where he sings a low-toned chant thus :—

"Jaugabangie cowa,
Rangagea cowa,
Gnaramma, Gnaramma,
Naragoo."

(Thunder come on, lightning come on, kill blackfellow.) This is repeated for about an hour. They do not draw omens from voices, animals, birds, &c., or use any other modes of divination.

Religious and Political Associations.

133. Nothing whatever of the kind is observed.

Men as Women; Women as Men.

134-135. Exchange of dress between the sexes is never practised at any time.

Sleep.

136. Sleep is forbidden only on the night of the performance of the ceremony at puberty. Those taking part in that ceremony are compelled to keep awake, the penalty for going to sleep is to be laughed at and considered "old-womanish."

Ceremonial Uncleanness.

137. There are no instances of ceremonial uncleanness beyond those already mentioned, but in some of their dances there is a good deal of unclean ceremonial.

Doctrine of Souls.

138-142. They quite believe that the body is possessed of a spirit or ghost, which they call "Gnabya," and when seen is in the nature of a shadow; but there are no particular occasions for the appearance of this shadow. No attempt is ever made to restore life, or call the departed spirit back to the body, and they

have no desire to see the ghost or shadow. Dreams are believed in.

143-144. The members of an adjoining tribe never see the ghost of a member of another tribe, and a man's ghost cannot be extracted or stolen from his body, nor can a person lose it by accident.

145-147. A corroboree may be held and a ghost commanded to leave, on which it is supposed to enter the earth and become a portion of it ; it cannot, however, be held or retained.

148. They do not believe in transmigration of souls. I have, it is true, heard it stated that the natives believe that when one of their people die he will, using their own expression, "jump up white fellow." This is entirely erroneous as regards these natives ; all that they know about a future state is comprised in seeing the shadow before described. As to whether they *do see anything*, I cannot say ; but they are very emphatic on the question.

149-152. Animals, trees, plants and inanimate things are not supposed to have souls, are not dressed as human beings, are not thought to possess a language of their own.

Demons and Spirits.

153-155. Are believed in only so far as has been previously mentioned.

Scape-goats.

156-157. They do not employ scape-goats. Any unfortunates, such as deaf and dumb, silly people, and imbeciles are well looked after.

Guardian Spirits.

158-162. They neither believe in guardian spirits, nor do they think that their lives or fortunes are bound up with some special object, the destruction of which will affect their own lives. Patron objects are unknown.

Resurrection.

163. They do not believe in any form of resurrection.

The Heavenly Bodies.

164-169. None of these are worshipped. The sun, they believe goes into the earth at sunset and appears out of the earth next morning. Stars are imagined to be pieces of fire, and they cannot explain the phases of the moon. An eclipse, they say, is caused by a "big fellow snake"; and if it be a total eclipse, he is supposed to cause some great calamity, such as floods, droughts, pestilences, &c.; but before the actual calamity overtakes them one of the tribe will dream what form it is to take. Thunder

and lightning is made by an angry blackfellow (*vide* 129). A short time ago the natives were camped in a deep gorge about fifteen miles from this township. This gorge is very narrow, and bounded on each side by high ironstone cliffs. During a very heavy thunderstorm a native woman was killed by lightning, when all the natives immediately fled in dismay and hid themselves under rocks until the storm passed over. I have frequently travelled through this gorge and have seen what terrible havoc the lightning makes of large gum-trees, rending, splitting, and hurling large pieces of timber to a distance of three hundred yards. The natives are excessively afraid of lightning, and will accuse the first native of another tribe they meet as being the cause. In their anger they are only too ready to fasten a quarrel on any one.

Sacrifices.

170-173. Sacrifices are never offered.

Miscellaneous Superstitions.

174. They profess to know the moment their wives have conceived offspring, by the shadow of an infant seen by them in the water when bathing. If a half-caste is born, they take just as much care of it as they do of the full-blooded black child, and the mother will tell you who is the father of the child without the slightest hesitation or reserve.

General Remarks.

The natives are very fond of smoking, and it is wonderful to see the quantity of tobacco they will consume. Men, women and children all smoke, and I have seen a child drop the pipe it was smoking, and go to its mother's breast.

Among some of the tribes the first joint of the index finger of the left hand is taken off—but in the case of women only; this is supposed to facilitate the getting of yams, in which operation a very small hole is made, and in this, it is considered, three fingers can be more easily inserted than four.

The young men, if trained early, are splendid horsemen. They are very athletic, and at all sports are far beyond the ordinary European.

Their principal means of communication is by putting up smoke. If they wish to indicate to a friendly tribe that they are going to a certain water-hole, they will make smokes in the direction of the *rendez-vous*. Their way of doing this is as follows:—A fire is made and allowed to burn low, then raked up together so as to form a small heap of live embers. A large quantity of gum leaves are placed round these embers sufficiently close to ignite when heated, and some damp grass is

then thrown on the embers. A dense volume of smoke issues from the grass, and the leaves igniting immediately forces the smoke upwards.

If two tribes happen to meet unexpectedly they form their camps so that each is nearest to his own country. The trespassing party explains why they are there, and if the explanation is satisfactory, a friendly corroboree will probably be held, otherwise a fight may ensue. At some of these accidental meetings women may be exchanged.

They are very expert in many ways, and it is surprising how quickly they can make a spear and have it ready for action; they are also very clever at making rope, which they use for dugong fishing. The rope is made from the bark of the Currajong tree, a species of *Brachychiton*, which these natives call "Myaddo."

In the foregoing paper I have endeavoured to the best of my ability to give a simple and unvarnished description of the manners and customs of these tribes, and trust that something of importance may be gathered from it. I must confess that many of the writings I have seen on the subject have been merely fancy pictures presented for the sole purpose of causing wonder and excitement. As I have previously stated, any information obtained from them must be their own statement, and not the answer to a leading question, however it may be put to them; to all such they are only too apt to reply, "Yes, that is the case."

I shall continue my investigations, and will always be too happy to send to the Museum anything special that I may obtain from the natives, or any information that will be of use.

APPENDIX.

Names of the various Tribes and their Localities.

	No. of Souls.	Habitat.
Leewalloo	130	... Vanderlin Island
Leeanuwa	110	... McArthur River, Borroloola
Leepitbinga	100	... McArthur River, 40 miles up river
Leearrawa	100	... Robinson River
Leealowa	90	... Limmen River
Leelalwarra	90	... Roper River
Leecundundeerie ...	90	... Calvert River
Leenaranunga	90	... Corella Downs
Leewakya	90	... Pine Creek
Leewillungarra ...	90	... Eva Downs
Leechunguloo	85	... Buchanan Downs
Leeangadigie	85	... Hodgson Downs
Leeillawarrie	85	... Bohemia Downs
	1,235	

From Vanderlin Island to Corella is about 260 miles north and south; from Roper River to the Calvert is about 300 miles east and west, and all the above tribes are within that area. There are a few other very small intermediate tribes; but I should not estimate the total number of aborigines within the area specified to exceed 1,600. Coastal tribes are numerically stronger than the inland tribes. On the Barclay tablelands there is a very large area of very badly watered country, consequently the tribes there are few and far between.

NAMES OF INDIVIDUALS OF LEEANUWA TRIBE.

Men.	Women.	Boys.	Girls.
Tarpetanna	Loorabombina	Moongaryala	Nooanghyema
Yarcooncoora	Rabookpooka	Gnarcoolumba	Wypoojubinna
Bindawadgie	Rowleerindowa	Gnarmoolarakoo	Weengetbinna
Yanbalinga	Tuboonmalanna	Gnarlangkoolinna	Rowgnarlemarra
Wyteemareea	Yarcangoora	Martookooroo	Rowillboonga
Gheponggarra	Larleeremanna	Gnarcaroomoo	Leerimboonda
Weetpoowoonyara	Beetingarooma	Gnareetanda	Tarcoomarlee
Toorakoopaddie	Yendamanna	Gnarteebama	Rarjumbalinna
Gnakoorabbie	Mongentoora	Gnarmeengoogie	Rowenbarooma
Gnarbeewaroo	Rarmanpoona	Tangareemadgie	Marloongubinna
Gnardoomanna	Rarmandeere	Karangarmadgie	Leerandeerie
Gnarteramboo	Rangatpoona	Myooroomadgie	Yarmandeerie
Gnarkeradda	Rarbooaboo	Gnarmodagie	
Gnargerdobbie	Beerepolinjanna	Gnarwarkareema	
Rareepoonga	Yeetangauna		
Gnargandarra	Jeekamalanna		
Gnarcoolapoona	Toongamaleema		
Gnaracarra	Moortokabinna		
Gnartagatte	Myyooawa		
Gnargonooka	Moogrubinna		
	Armarawoonga		
	Marlindeerie		
	Rargukoobinna		

This list, with one or two exceptions, and about half a dozen infants, say eight more souls, constitute the whole tribe at the present time.

May 24, 1893.

A

ant (white), rowmarwidgie
ant (black), pingee
ant (green), rowinbeeya
arm, gnarowie
angry, wonginnie
arise, leawarra
after, bargoo; by-and-bye, "bargoo, bargoo"
all, calagga
attempt, wareea (go and try)
ant hill, yareewee
ankle, arnadanga
ashes, arwilla

B

bark, nowelakoo
bee, narboolooloo
boy, ardoo
back, arnawookoo
belly, arnawoodoo
blood, oolya
bone, arnawynyarda
big, wardeerie
bird, chulaggie
black, woonga
blue-tongued lizard, meenyando
brother. wonarga
boat, ramardoo (made of bark)
basket, rowilboonee
boomerang, wargillie, rarmantaperoona
boat-shaped water-vessel, loodoo-loodoo
beetle, quegindie
broken, keeloonoo
bald, ardaboo

brave (bold), nargoongie
better, namerookung

C

cockatoo (white), rarparra
cockatoo (black), rarleeraka
cat (native), rarlanboo
crow, roowoongoo
clouds, gnarwoo
cough, ooloo
chalk (white), owamboona. Used by natives in ornamenting
creek yarla
cockroach, namarooba
cramps, coonaandarrie
come here, cabba cowa
coming, bargee
crying, keewyarrie
crab, yinga
cockles, yarcabacadda
crocodile, mardoombarra
creep, jeewarcangie
cooking, woobya
charcoal, moondoo
camp, mowalangie
children, leeardooberrie
circle, locoloco

D

dew, howmoomaloo
duck, rowgumba
dog (dingo), warkookoo
dead, nangabangakoo
death-adder, wangmacoona
daughter, rangatarrawardoo
dilly-bag, mooloo
dark, moondooro
drink, woondya
dust, moongoo
dumb, ryackayaka
deaf and dumb, yacka bacabba
deaf, bacabba
dugong, keelungakanna
dry, warrema

E

eggs (generally), wadda
emu eggs, warrie
emu, arnanganda
eye, warnammie
ear, naralinna
excrement, mowwoona
every time, keeloowarra
everywhere, yeergumanda
extra, nayerbarra
eagle, arjarbarumba
earth, owarra
ebony, marpooyarra. Grows plentifully on this river
eclipse (sun), arkalango
echo, wypanda

F

fish, arlkoo
far, wagga
foot, arnamandoo
fingers, arnamaliggie
fire, bweega
feathers, ooloo ooloo
father, woonyadda
fighting, tarlinambya
flat country, mangoona
flying fox (*Pteropus*), marlinginna
feather ornaments, burraka burrakawa, markoodyee
flesh (human), arnawangie
fun, wootoo
flying, loorunga
foam, yoordoo
fire-making sticks, marboodalla

G

grass, woortooa
goose, rowoondangoo
good, rowmoorookoonga
girl, rowarmalangie
gum, marmindie
go away, bowagindeea
green, mardangoo
gale, lambidgie
gall, weegul
gammon (to hoax), darwadde monginnie
gape, darnalidgie
gavial, ootpee
get it, yeenda ardooma

H

hill (large), woodowa wardeerie
honey, doolbarrie
hair (human), arnawada
heart, tannacowandie
hand, arnamalidgie
head, arnawoolya
hawk, toolawaleerie
hailstone, wykoo
hot, gnardya
husband, goangadda
hair-twine, woodyee
him, arloo

I

iguana, chugoobaddie
illness, jumbamarangie

ibis (white), rarboolabool
ice, wykoo Seen by natives on several occasions in the shape of hailstones
idiot, tewarwarngaringie
imitation, barraguaninna
impotent, narmunda

J

jump, jumbarangie
jawbone, arndarra
joy, wootoo

K

knock, keewamba
kitten, booree
know, teenalarnjimmo
kangaroo, woonallee
knee, arnaboora
kingfisher, wardoo
king (chieftain), noweddie
kestrel (small hawk), rowakalla
kick, karraparannie
kill, wyamma
kiss, noweeya
knife, lamma

L

louse, rowooda. Natives eat them
lightning, rangadgea
leg, arnarama
leaves, wangie
lily root, mardarra. Excellent food
laughter (joy), wootoo
lagoon, mangowa
long, wandoowandoo
liar (see "gammon"), darwa ademonguinno
like, jinnalowangie
light, nabooloo
large, wardeerie
leaf, wangie
longer, wandoowandoora
life, bajallie

M

mouth, gnarwooloo
man, gnarminingeea
male infant, gnapadda
moon, gnacalla
mother, paradda
mountainous, weerie wardeerie
meat, oolungoo
make, nayabeema
mirage, waringoo

N

no, wamboo; (no! no!! wamboo wamboo)
near, kawookoo
nose, arnung wooroo
necklace, arnoomoonoo
new, teangoo
nimbus (black clouds), gnoowoo
nipple (breast), noewoona
notched stick, woonda. A letter from one chief to another.
nothing, neegee

O

oyster, arngoolee
opossum, beewallie
ochre (yellow), narmarra
ochre (red), nargangoo
offend, narngawinnie (see angry)
open, narangya
orator, langoo. A native who talks a good deal.
orphan, nowoojiggie
often, arigilla
over, warbya

P

plenty, meetembangoo
pigeon, rarmarloowooloo
parrot, karbidgie
porcupine, rarbarlarra
poison? namarowa.
paddle, ryeemee
pain, tarnarookooringie
passion, warngawinnie
penis, dyimboo

Q

quick, tooloo
quail, rowoomulo
quarrelling, wanga

R

run, woolooma
rain, meewidgee
river, namananga
robber, gnarngina
rope, myemadda. Made from inner bark of Currajong
running water (fresh), wyarama, wyarrie
running water (salt)—
arlebee wyarrie wyarama
salt water running
red, oomalidgie
rock, woodowada

rainbow, loowa
refuse, tarba arnungoondarra. I refuse to give it

S

ship, nowoolga
snake, lewa
spear, moweradgie
sand, owarra
stranger, moonanga (white man)
skin, nereea
shield, myardooyadda
small, kookoodoo
sun, rarcamba
sky, gnow
shark, yeelmundie
sea, arnda
scrub (thick forest of small trees), warndeea
son, yongadooada
smoke, oolua
summer, ramardoo
stone tomahawk, rowilcongoo
sun down, tarnembya rarcamba
spear (barbed), moweradge pidgie
spear with stone head, mowerdowda. Half the word stone, half the word spear
stone, woodowada
salt water, arleebee wyarrie
salt, arawa
stop, parjeenmaya
sit down, yeepandarra
silence (hush !), larbonmya

T

tree, wondaree
thunder, jangabangie
this, madda
that, namanyadgie
they, narmboo
toes, arnweeridgie
tongue, arnunganda
to-day, looragoo
to-morrow, ecarra ecarra
teeth, arnamyee

U

under, arlpya
unwind, yinmya
understand, narlaya

V

venereal disease, jacama
virgin, jyalgwie
vagina, darwaroongoo

W

womera (throwing-stick), narleega
waddy or club, barkoo
white, oolawidgie
water, wyarrie
wood, moornimba
wind, lambidgie
where ? arnda
when, arndoo
why ? gnaroo
what, arlee
wallaby, woonaree
woman, arnanwya
wife, rangatarrawadoo
white man, moonanga (stranger)
wild turkey (bustard), tooladgie
whirlwind, boojumarra

Y

yes, yah
yonder, mambarnoo
yellow, tarngoorango
you, yarcarra
young, ardeeyangoo

I am hungry—arna wyndygoo
give me some food—tappa mongarra
I am thirsty—arna woondalla
give me some water—tappa wyarrie
give me some kangaroo — tappa woonallee
where is the water ?—arnda wyarrie
is the water permanent ? - patjeewa wyarrie ?
where is the creek ?—arnda yarla ?
show me the water—nejarra wyarrie
I will give you some food—keena mongarra
do not be afraid—parnee wardangya
I am not afraid—angya wyappa. [The idiom is changed, and only a portion of the word afraid is used.]
where is your camp ?—arnda mowalangie ?
have you seen white man ?—arndara moonanga ?
I am going away now—bowitjee (going away) arna (I am)
you go away—bowitzee arcarra
I am very angry—arra weardie wanga
why are you angry ?—gnaroo (why) wanga (angry) ?
you make fire—melam bweega

Anthropological Notes on the Aboriginal Tribes of the Daly River, North Australia.

By the Rev. Donald Mackillop, S.J.

[Communicated by Prof. R. Tate.]

The Daly River tribes best known to us are the Cherites, the Ponga-pongas, the Mulluk-mulluks, and the Mat-ngelli. The Cherites, a small but intelligent tribe, occupy the land between the sea and the river on its right bank. Opposite them, on the left bank, is a powerful tribe called Wogites, of whom we know very little. Next to the Wogites, on the same bank, come the Ponga-pongas, whose language is just the same as that of the Cherites. Next to the Cherites, on the right bank, are the Mulluk-mulluks. Their language differs from that of the Cherites, yet only as one Greek dialect differs from another. This brings us more than 60 miles up the river. The Mulluks are also on the opposite or left bank. But a few miles inland and to the west, begins the region of the Mat-ngelli, or Hermit-hill tribe. The Mat-ngelli have the Ponga-pongas on their north. Their language, although in structure and idiom very similar, differs much from that of the other tribes mentioned.

All these natives are powerfully-built men, who have at times shown very great hostility to the whites. Indeed, some years ago they had the name of being the fiercest blacks of the Territory.

All these tribes intermarry. I should think that there was a time when the laws regulating marriage, so marked in other parts of Australia, obtained also among the Daly River tribes. At present they do not. A man may not marry a blood-relation, however remote the kinship be, but marriage within the tribe is permitted and common. Very often, however, the woman is of another tribe. Marriage by capture was certainly at one time the rule. Even now the phrase *to steal a lubra* is the only equivalent known to me for the phrase *to marry*. In their gesture-language, to clasp the left wrist with the right hand expresses the same idea. It is in fact *ducere uxorem*, but it means more than to lead the bride home; it is to lead her off captive.

Marriages, or rather espousals, are arranged by the old people, while the children are very young, sometimes even before they are born, but then, of course, conditionally upon the child being

male or female. A young man not so provided for must steal a lubra, either from his own tribe or from another. If from a strange tribe, he will be persecuted by her friends for a time, and if caught, he will have to fight for his lady with some man chosen from the offended tribe, or he will have to run a gauntlet of spears. I know a case where a man so captured refused to fight a single adversary. He told the friends of the stolen woman—the third or fourth of his wives—that if they wanted him to fight, they must bring out against him the two best men they had. They did so. It was a hand-to-hand fight with their great heavy lance-headed clubs. But so great was the strength, reach of arm, and skill of this man, that he very soon disarmed and nearly killed his two opponents. This was the notorious "long-legged Charlie," who turned Queen's evidence at the time of the great Daly River murder case.

If the young man steal his wife from his own tribe there will also mostly be a row, always, of course, should he take the wife of another man. In this case the injured husband troubles himself very little. Sooner or later the fugitives must return. Then he punishes them. They must submit, and he must have blood from both. He does not, as a rule, spear them in the usual meaning of the term, but prods them with a spear more or less severely as his wrongs have been greater or less. This, if he intends to spare the woman's life. She then returns to her lawful allegiance, and there is no more about it.

If you ask a young man how he came to be so silly as to expose himself to this certain vengeance, he will answer: "Lubra been kill'm me eye," which, translated, means that he was bewitched by the woman's eye. Whenever—and this often happens—the young man believes that a woman's evil eye overcomes his liberty, he resents the insult even should he yield to the tempter.

Riding once through the bush with a lad of about seventeen, he pointed out a hill which he had good cause to remember. It was about 20 miles from his home, and so far had he once escaped with the wife of a fellow-tribesman. He laughed heartily as he told me the story, how the woman was always pestering him to run off with her, how he told her he did not want her, that he was only a boy, that her husband would kill him, and how, overcome at last by her importunity, he said, "All right, you and me run away!" They had reached the hill in question. It was raining. They were seated on a stone, holding a sheet of bark over their heads. Suddenly the husband of the runaway stood before them. His spear was poised, and he looked murder. "If you were not of my own tribe, I would kill you now," he said. "Kill me," said the young fellow; "I have stolen your wife." "No, I will not; you are only a boy!" "Very well, beat me,'

said the other; and held out his head. He was beaten, but his head proved harder than the wommera, or throwing-stick, used to chastise his youthful folly.

Polygamy is practised, but not very commonly, and the men most respected in the tribe have only one wife. They are also as a rule very kind to their women, and receive in turn very great deference and obedience. It would be quite against the dignity of a Daly River man to carry on an angry dispute with a woman. Of course nature will out at times, and it is amusing then to watch the stoical black man. He will listen in silence to his Xantippe, at most yielding her a contemptuous shrug of the shoulder. Of course the woman grows bolder. After a while the man stands carelessly up, and with a well-directed blow on the head from a club, he fells his better half to earth. When she comes to she is again his loving and obedient wife. I remember a case, however, where a woman, one of two, happening to be of stronger build than her lord, took a cudgel herself, and gave at least as much as she received.

In these tribes a man is the natural protector of the wife of his dead brother. She does not necessarily become his wife, and may, if she will, return to her father.

A father's brothers are all called fathers by his children, and a mother's sisters are mothers. How far the Tamilian system obtains I have not yet discovered. The fact just mentioned may prove a starting point only. Certainly their system of relationship is intricate, and widely different from ours.

I might mention here that the man who gives a wife to another becomes related to that other. They are friends for life, and any injury done to the giver by the receiver would be a great offence against tribal law. I myself, the way things are going, will soon have no end of such relations. The blacks call me *ngan-larama*, or master of marriage. It came about in this way. As I mentioned already, children are often disposed of when very young. You will easily understand how injurious to our work this custom might prove. A girl, for instance, for years on the station, might in the end have to go off with some old rascal 30 miles away as his third or fourth wife. When they bring their children to us, the blacks surrender this tribual right of the head of the family in favor of the superior of the mission. Of course we never use this right, except with the full approval of the parties most concerned. They are human, and have their likes and dislikes. They know too—for we teach them so—that in this matter, they are free to choose within the limits allowed by our Church. To free them gradually from the tyranny of the old men we have to interfere for a time. But the young people are glad that we do this, and so far all has gone well.

Here is a case in point. A young girl who had been with us from a child—the best girl, in fact, on the station—wished to see me about some trouble or other. She was afraid of the wild blacks; so was I, in her interest. I strongly advised her to marry. She laughed, and said she would rather remain free. I told her this could not be; she was growing too big—we had yet no nuns on the station—for I verily believe her desires went in this direction. I reminded her that there were several eligible young Christians from whom she might choose. At last she gave me to understand that if it needs must be so, there was one young man to whom she would not object. I innocently advised her to tell him so. Then I was surprised indeed. She was horrified, and positively blushed—for blacks can blush. Such a thing could not be thought of, she said; he must speak first. All I could obtain was permission to let the young man know the coast was clear, for his ambition would not have gone so high. This I did, and before many days I found they were engaged. I afterwards married them. They are a happy couple, and have their little farm. Of course, I am now their father; but they have a special word signifying father in this relationship, and in speaking to them I should not say simply *child*, but should use the term which is correlative to that used by them when addressing me.

Circumcision is practised by all the Daly River tribes. A few refuse to submit to the operation. If able to escape the old men for a few years after the time—about fifteen—for the operation, they are left in peace. But for life they will be called *Larrikiyas*. The Larrikiya is the Port Darwin tribe, who do not circumcise. The mutilation practised on the Victoria and in other places to the south and south-west, I mean the slitting of the penis, is not known on the Daly. I wish to emphasise this fact, for I have heard the contrary maintained by a travelling doctor, whose only proof, given to me, was, "Why, man, I have read a paper on the matter to the Royal Society in England." So is history sometimes made.

The women have a curious mutilation. When young girls they remove the two first joints of the right forefinger. The operation is most artistically performed, judging by results. Yet they use no knife or, as when circumcising, sharp stone. They find in the jungles a very strong cobweb, and with a thin skein of this they tie tightly round the joint. The circulation is, of course, stopped, and after a time the dead joints fall off. This custom is far from universal.

In great sorrow they shave their heads.

The natives are undoubtedly cannibals, but then their cannibalism is peculiar and limited. Infanticide is very common, and

they often eat murdered babies. They seem to consider this the kindest way to bury the little ones, and only the nearest and dearest friends are allowed to partake of this repast. But they will not touch the head. They say the devil-devil, *i.e.*, the ghost or spirit, is in the head. They always bury it.

A blackfellow will always deny that his tribe practises cannibalism, but accuses every other tribe of the same. The Cherites once told me that the Ponga-pongas, not content with an odd baby, really fattened up girls for the shambles. About twelve years of young life were allowed them.

The natives tell us also that to the south-west there is a small tribe which inhabits a hilly and very poor country. It happens sometimes, especially through bushfires, that they are absolutely deprived of, and far removed from, all sources of supply. They go to sleep, the young men knowing well that before morning one of their number will be killed by the old men. Each hopes he will not be the doomed one. With the provisions so obtained the little tribe moves on next day to a more favoured locality.

When a child is to be murdered the doctor is called. The children believe the child to be really ill. While the doctor or executioner examines the child, a great "keen" is raised, during which he strangles the infant. These doctors are great rascals, and what is said of them in other parts of Australia might be repeated here. I saw one performing once. As he approached the sick man he looked to the sun, as if praying. Then he seemed to mumble some charm. He would continually draw his fingers through his opposite arm-pit, and rub the moisture so obtained into the body of the patient, blowing every now and again over the parts so rubbed.

But apart from these mummeries they do seem to know something of the curing art. They certainly go in greatly for *massage*, and I know by experience that they can give relief. In very violent cases of headache they bleed their foreheads. They are very temperate in the drinking of water, even on the hottest day. They say it is not good, and prefer a bath.

They attribute to the smoking of the dried leaves of the native yam—*amorphophallus*—the effects which we obtain from ether or chloroform. A short smoke makes one sleepy; if he smoke too long he will not awaken. While so sleeping he is, they say, unconscious of pain. On the other hand, although a species of chinchona tree is very common, they do not seem to know that this might be of use to them in the fever so prevalent in that marshy country.

Cases of cancer are frequent, and syphilitic diseases seem to gain upon them. As far as I know they have no word in their language for this disease. They seem also to have no cure. It

simply bewilders them. Strange as—considering all the circumstances—it may seem, I believe syphilis to be of recent origin among them. There are cases also of something very like leprosy. As a rule they die by murder, of consumption, or of old age.

When they do not bury their dead, they either burn their bodies, or put them up in trees until only the bones remain. These are then buried. The blackfellow, properly so-called, *i.e.*, who is neither old man nor woman, is entitled to the honour of being rolled up in paper-bark and placed in a tree. Terrible scenes may be witnessed during their burial rites. Here is one. A hole five feet deep—only that I insisted upon this they would not have gone deeper than two feet—the naked body of a dead man alongside. When all was ready they politely requested me to go away. I refused. They insisted, saying that they wanted to cry. When they found I would not go, a scene began which I shall never forget. The men divided into two lots, one to get the corpse into the grave, the other to prevent their doing so. I thought they would pull it to pieces. Meanwhile the women raised a terribly weird cry, and worked themselves into a real frenzy. They were armed with ironbark sticks, about two feet long, pointed at one end, and about one and a half inches thick at the other. As they sang, they would beat their shoulders and backs with the thick end of this weapon, inverting it every now and again, and driving the point into the crowns of their heads, every such stroke being followed by a strong squirt of blood. It was terrible, and quite new to me. I snatched the sticks from the women, and watching for an opening, rushed in with a couple of strong young blacks, caught hold of an arm or leg of the dead man, issued a quick, sharp order, and before the opposing party had recovered from their astonishment at my interference we had dropped the body into the grave. Slowly to lower it was out of the question. Then amid most heartrending yelling they filled in the grave. One man remained sitting on its trunk until buried to the knees. The scene was so awful that children present ran away, looking back at intervals over their shoulders in most lively terror. And yet it was all acting. Except three or four of the dead man's near male relations, who, with heads over each other's shoulders, wept quietly apart, the grief of the others was a worked-up frenzy. When all was over, they went laughing away.

Very different are our Christian burials. And they have made a marked impression upon these very impressionable people. One of our young men near to death begged of me not to permit the blacks to bury him, and was quite joyful when I assured him he would get a happy Christian burial.

The natives do not believe in natural death, even when it be the result of accident. Every one is killed by the sorcery of another tribe. This fact, with the infanticide so widely practised, is in great measure the cause of the thinness of the population. It means practically the doubling of the death-rate. A man dies —it may be from snakebite. The snake was forced to kill him by the magic arts of some one in a hostile tribe. And some one of that tribe must die. The strange thing is that the tribe which so loses a member will not retaliate. They wait until one of their own people dies, when, of course, they too must have a victim. The rule is that the victim is murdered wherever found. But sometimes an embassy is sent and a victim demanded. I have heard of a case where a great man having died from snake-bite, and the old women having declared that the sorcery came from a tribe about a hundred miles away, such an embassy was sent. They demanded *pro gravitate causae* three victims, and were satisfied. I must say I do not believe this statement to be true.

It is of no avail to try argument by induction on this point with a blackfellow. You may tell him that his fathers have all died before him, that therefore he too must die. The most you will get him to admit is this: "They were sick; I am well; I shall not die."

The sorcery in question is of various kinds. This is the most common: "Wild dog. Blackfellow been take'm out fat." For years I laughed at this, and tried by ridicule to beat down the widespread belief. On one occasion a very intelligent Cherite got angry with me. He said you whites understand many things —you know how to make steam engines, fine houses, gardens, &c. —but this matter you do not understand. I was convinced from his manner that there was something behind it all which he could not make plain to me. If in ridicule I might ask: "Where is the hole through which the fat was taken out?" the answer would be: "No! you no more savey—him no more want im hole, that one doctor; him too much savey no more hole." I do not laugh at them any longer. I think I understand them. Rightly or wrongly, they believe that by magic arts the victim is thrown into a decline, from which death results. This, I am confident, is the meaning of "take 'm out fat."

I have said rightly or wrongly. For although in such matters I believe nothing which has not been absolutely proved, and which cannot by any scientific reason be accounted for—while I know that science will smile incredulously at my admission—I must nevertheless admit that facts have come under my observation which have—well, staggered me.

This brings me to the religion of these men. They believe in a being superior to themselves, but evil. If ever they pray to

him it is simply to let them alone. They would never dream of asking a favor of him. He is, and always has been, their bitter enemy. They have a ritual, a somewhat elaborate one too, but few, very few of them, know the significance of the rites they practise. I believe some few do. There seems to be a sort of freemasonry among them, and an inner circle, few in number, who alone know the meaning of their ceremonies. I believe, too, that these few could, if they would, reveal very much about their past history and traditions. But it is simply impossible to get any information from them. They are bound to secrecy, and I think death is the penalty should they reveal anything to the uninitiated.

I am about to make a strong assertion; but I believe it to be true. I believe they have human sacrifices, that from time to time one man, with his own knowledge and consent, is offered in sacrifice for the good of his people—offered to the evil spirit whom they so fear. This is the leading feature in the great religious and highly immoral ceremony, which they celebrate every few years. They call it *Jaboi*. In some secluded place they form a ring, just like our circus rings, and of about the same diameter. Here young men to be initiated into some lower grades meet at midnight in charge of some of the inner circle mentioned. What there takes place no white man may witness. This rite lasts for about three weeks. Of course, we have collected many facts relating to this matter, but I do not consider that our knowledge is yet precise enough for publication. What seems certain, is that they undoubtedly worship in fear an evil spirit; that sometimes they offer their fellow-men in sacrifice to him, and that the visible emblem, if so I may put it, of their religion, is the human penis.

Superstitions they have without number. The spirits of the dead live in the trees, and eat of their fruits. Rain is caused by the tribes from whose direction it comes, so also are the winds. A certain blackfellow goes up to the moon once a month to fight the evil spirit. If he did not do this, the evil one would kill the moon. "But this man cannot fly," I once argued; "he has no wings." "Oh, the devil-devil brings him up," was the ready answer—to fight himself.

The doctors carry certain bones—I think of the devil-fish, which are serrated and over six inches long. Women and children are not allowed to see these bones, and the blacks fear them as they would loaded rifles. They call them *barrit*. The wounds produced by them never seem to heal; they become like cancers. Indeed, the blacks call cancer *barrit*. They believe that a doctor, the holder of such a bone, can produce these sores even at a distance. To prevent stealing from our garden, an old man once

advised us to take a pannikin of water, and dipping a barrit-bone into it, to drop the water from its point along the garden fence. He assured us that then no black man would dare go over that fence. I felt half sorry that we could not lend ourselves to this superstition. A few miles from where we live, and not far from the river, there is a hill called, in Mulluk-mulluk, *alalk-yinga ;* in the Hermit-hill language, *verak-yinda*, *i.e.*, the place of the children. The natives believe that the souls of future children—or perhaps the children, bodies and souls—are shut up there. They are under the care of one old man. He has to see that they do not escape, and to supply them with water. This he does by means of an underground communication with the river about a mile away. The range, of which the hill in question is the last one, runs right to the river. When a child is to be born, this old man sees to the business. Laughing once over this matter, I said to a young man, "Well, if all this be true, you were once in the hill yourself?" "O, yes," he answered. "What sort of a place is it, then? You should know." "Ah! too much long time; me been lose'm," *i.e.*, I have forgotten.

Strange stories are connected with the stars and constellations. They sometimes group the fixed stars as we do ; often otherwise. The Pleiades are children who ran away from their tribe, and got fixed for ever in their present position. Every group seems to have its story. The sun returns to his eastern position by a route, so far to the south, that we cannot see him.

Each tribe has its own territory, and even within the tribe groups of families have their special headquarters. Men are supposed to supply the animal food, women the vegetable. The *lotus*, or large red water-lily, is very abundant, and during several months of the year they live entirely upon its roots. The seeds also of this beautiful plant are highly prized. They are similar in taste to green hazel-nuts. Pickled in brine we too very much appreciate them. Even the stems of this lily at certain stages are eaten, and taste, as they look, like rough celery. The large leaves form wrappers for various purposes.

These tribes go absolutely naked. The folds of the ubiquitous paper-bark give them blankets when they require them, roofs for their rude huts, dishes for their meat, tinder for their fire (producing) sticks, and receptacles wherein to carry very young babies. I have found that this paper-bark is enormously rich in gas, so much so that had we the necessary appliances we might with profit employ it to light up our "Reduction."

I just mentioned very young babies. In a very short time the little ones learn to ride, even asleep, on their parents' shoulders, their feet dangling in front. They never fall; indeed, there

seems as little danger of this as there is in the case of a young opossum on the back of its mother.

About their language I shall say little, as at some future date I hope to forward a paper on this subject to your Society. It is a beautiful language—or rather, contains the elements of a very perfect one. So philosophical is it, that it forces the conclusion that this despised race in times remote and in other lands was very much higher in the social scale than we now find it. Take only the question of gender. They have stolen a march upon us. They distinguish carefully between organic and inorganic nature. Whatever lives will live an animal or a vegetable life. If animal, the gender will be male or female; then comes the vegetable, or lowest form of life; then inorganic nature. A tree living belongs to the third gender; cut down it passes into the fourth. All adjectives capable of the inflection must agree with their nouns in gender, and the verb in the third singular has all four forms and must likewise agree in gender with its noun. The word *muelang* (shadow) is a beautiful illustration of the saying that the exception confirms the rule. It is the only exception known to me. It is of the third gender. The fourth gender always denotes a passive state. "The stone is on the ground" can only mean in this language "is inanimate on the ground." Now a shadow seems to move and of itself. Therefore I suppose they rank it with the lowest form of life. Fruits, as well as the trees producing them, belong to the third gender. The moon is masculine, the sun feminine. All this may seem surprising. But this is little. Their language abounds in highly metaphysical distinctions unknown to ours. The preciseness with which they express the different modes of being is astonishing. And yet because they translate one of these modes by *sit down*, it has been argued that they have no substantive verb! They have a verb *to be* in a sense to which we can lay no claim. It unites the perfections of the Latin or Saxon verb with those of the Celtic, and goes far beyond the powers of either. But I must not enlarge now upon this subject.

We have gained at last the complete confidence of these tribes. They are bright enough, and take very kindly to agriculture. If reasonably assisted, even if left unmolested with a sufficient territory, we could reproduce on the Daly River those "Reductions" which a recent writer, Henry George, says, "To their eternal honour, the Jesuits instituted, and so long maintained in Paraguay." All the elements necessary to bring about such a state of things are present in ever-expanding power, notably, to quote the same writer, "The only force that has ever proved competent for it—a strong and definite religious faith." Shall we succeed? Even in the interests of science, Australia should

enable, or at least permit, us to do so. But the odds are at least ten to one against us. Not from any unfitness on the side of the aborigines; not certainly from want of will, or through the failing of the spirit of sacrifice in the Society of Jesus; but, to put it kindly, because the Anglo-Saxon race is what it is. Proud in its present superiority, that race will remember the lessons of history only when an invading people shall have meted out to it the justice which it has shown to the helpless blackman. A hundred years, perhaps hundreds, may pass; but with the teeming millions of Asia at our door, who shall say no day of retribution will come upon Australia?

Descriptions of South Australian Brachyscelid Galls.

By J. G. O. Tepper, F.L.S.

[Read August 1, 1893.]

Plates III.-V.

The Brachyscelidæ, a family of Coccids, appear to be entirely endemic to Australia, only extending in an aberrant form to New Zealand. At present the family is composed of a limited number of genera, of which the typical one contains most of the described species. The family with three of the genera was established by Schrader in 1862 on material collected in New South Wales, several species being described and figured by him in the "Transactions of the Entomological Society of New South Wales," vol. I., pages 1-8. His descriptions are, however, unmethodical, and therefore unsatisfactory.

Quite recently Mr. W. W. Froggatt published a further contribution in the "Proceedings of the Linnean Society of New South Wales," vol. VII., series 2, pp. 353-372, of which he most courteously and obligingly sent me a separate copy. In this he re-describes intelligently Schrader's species (5), and adds eight new ones of *Brachyscelis*, mostly illustrated by excellent figures.

Finding that these two papers constituted the whole literature of the subject of Brachyscelid galls, and that the work containing Schrader's figures existed in the S.A. Public Library, I compared those in the collection of the S.A. Museum (mostly brought together by myself) carefully with the published descriptions and figures, and found that nearly all our S.A. species were more or less widely different, and therefore new and undescribed, and that even the few which might possibly be included in one of the other species, were more or less aberrant in detail. Being precluded by a Museum regulation from communicating specimens of, or information on undescribed species to extra-South Australian specialists, I have myself worked up the subject, and present herewith the results as a contribution towards a more complete work of the future. The illustrations have all been drawn from the type specimens by myself, and represent them as truthfully as possible. The species are all figured for the first time.

The Brachyscelid galls form undoubtedly some of the most

wonderful transformed vegetable products on account of their symmetry, or regularity of form. They are produced by a minute, almost microscopic, insect lodging itself at the apex of an embryo-bud, either of a lateral, or terminal branchlet, flower, or seed vessel, and these grow around and over the insect in a fixed form, according to each species, instead of assuming simply an abortive form of their original habit, as in so many cases of other gall-forming insects. Each terminates one of the axes of the hostplant, be these twig, leaf, flower-bud, or young seed-vessel, and each contains only one of the originators in the genera *Brachyscelis*, *Sphaerococcus*, *Cylindricoccus* and *Frenchia* (the three last established by Mr. W. M. Maskell, but their position left undetermined, Trans. N.Z. Inst., 1891), while in *Opisthoscelis* and *Ascelis* they are formed by the bulging out of the foliolar epidermis on one or both sides, and the space surrounding the insect filled by spongy, endodermic tissues.

The originating insects themselves (*i.e.*, within the same genus), as already remarked by Schrader, present such slight differences that they are almost unavailable for identification, and the working out of the causes producing the varied result in respect of the species will no doubt provide some future biologist with some most interesting study.

All Brachyscelid galls have a small or even minute opening or aperture at or near the centre of their summit, or exceptionally in the base. This communicates by means of a narrow channel of various lengths with an oval, oblong or cylindrical cavity, which is either more or less completely filled by the occupant, or more or less in excess of its size, and then usually more or less occupied by a fluffy, waxy exudation. The galls of the two sexes are widely differing in form and size. The male galls are always very much smaller, more or less elongated, forming cylindrical or conical tubes, and are either on the leaves, young twigs, or (rarely) on the female galls, occurring either singly, distantly scattered, in crowded clusters, or irregularly. The perfect male insect is described as being very minute, ranging from one-eighth of an inch to one-sixth, furnished with a pair of wings, perfect legs and antennæ, and two long anal setæ, or fine hairs. They have only been observed in a few species (no South Australian), and of some species even the male galls are still unknown.

The female galls, on the contrary, are mostly of very much larger size, of definite form for each species, and either placed singly on branchlets or forming crowded clusters on their terminations. In the latter case the galls are usually more or less distorted. A characteristic specific difference appears to be exhibited in the direction of the axis of the gall—that is, whether more or less vertical, lateral, or dependent. It seems self-evident

that this must be in reference to the established habit of each kind, and that it is essential to the wellbeing of the insect that its head, which is always directed to the point of attachment, *i.e.*, the *base* of the gall, either bear the weight of its body, or be relieved of it when lateral, or that the posterior end in pendant galls bear that weight.

A sectional difference appears to be afforded by the type of the form, *i.e.*, whether regular or symmetrical; in the former case all longitudinal sections are normally alike, in the latter only one such will produce similar halves—irregularity is always the result of abortion. The above differential characteristics I propose to use as a convenient artificial classification of the galls until further knowledge of the insects themselves may furnish a better one.

The female insect varies in form from broadly turbinate to elongated fusiform in the genus *Brachyscelis*. The head is completely fused with the thoracic segments, and separately undistinguishable; it is, therefore, included in the term "thoracic part of the body," and is usually thick and forms the greater portion of the bulk. There are eleven dorsal segments besides the last, which is very small and bears two subparallel, horny "tail bristles" of varying length. The segments are more or less constricted at their junction, those of the abdomen decreasing rapidly in diameter to the acute apex, and are either quite smooth, armed with short spinelets, or (especially those of the abdomen) more or less clothed with fine, sometimes rather long, hairs. Ventrally six, very short, three-jointed, widely separate legs are placed near the margin; the forelegs near the anterior extremity are the shortest; a little behind, and forming a triangle with them, is placed the minute mouth, or what is considered as such. Schrader says that "he could not detect the promuscis in his specimens, and was in doubt whether an opening existed," but in a large, fine specimen of my *B. ovicoloides* the latter appears to be quite distinct under a strong double lens, and Mr. Maskell describes the oral parts very succinctly in his genera. More in front and laterally the very short antennæ are placed near shallow, more or less indistinct, impressions considered as "eye spots." The former I have not been able to detect in the above specimen. The hindlegs are the largest, the forelegs shortest, and the others intermediary; all consist of three joints, the basal one being very much thicker than the others, the last very minute, bearing a minute simple claw. The colour in *Brachyscelis* is usually a paler or darker rusty-yellow or brownish tint, the terminal bristles being dark-brown or black. When alive the whole body is surrounded by a whitish, fluffy substance, exuded from the surface, of a waxy nature apparently, and which almost entirely dissolves in alcohol.

These remarks refer more especially to the above-named species, but apply more or less to all others. I have not myself observed the earlier stages, but Schrader states (l.c.) that the male impregnates the female through the narrow opening, and that she finally becomes a mere mass of eggs enclosed by the bare skin; that the young larvæ (l.c., i., figs. *h*, *b*) are microscopic, very active, flat, oval, margin fimbriated, with rather long, curious antennæ, and two very long terminal filaments.

Some species of *Brachyscelis* (perhaps all) are very prone to be affected by parasites, and not only the insects themselves, but the galls formed by them. The latter thus become very much distorted, and their form greatly modified. Examples are shewn on plate iii., fig. 1*g*, and plate iv., fig. 1*g*, fig. 2*f*. This action is so predominant in some instances that the host becomes stifled, the inner cavity wholly obsolete, and the shape so irregular as to be past recognition if seen by itself. Several species of Hymenoptera (inclusive of Chalcids), Coleoptera (*Scymnus*, *Haplonyx*, &c.), and a moth in chrysalis stage have been bred from some of the Mallee species. This prevalence of parasitism is no doubt the cause of the comparative rarity of most of them (except locally), notwithstanding the extraordinary protection of the prolific female.

Regarding duration of life of gall or insect nothing definite seems to be known. According to my own observations, the attainment to full size of the larger woody galls may require several years, the life of the female probably depending upon the access of males either earlier or later. Fecundation resulting, as is well known, in accelerated development and early death, and vice versa, among the *Articulata*.

In respect of distribution of *Brachyscelis* in South Australia, it may be remarked, that although I am familiar with them for nearly a lifetime, they were not found abundantly, except in isolated instances. The Mallee Eucalypts (*E. gracilis*, *dumosa*, *uncinata*, *oleosa*, and *incrassata*) furnish most of our species, while *Eucalyptus leucoxylon* harbours two, and *E. rostrata* three (one not yet described and figured) kinds. The Brachyscelid gall on *Beyeria opaca* (pl. v., fig. 3) is the first instance of such outside of Eucalyptus, hitherto the exclusive host, but it may prove to belong to another genus, when the gall-forming insect becomes known.

Classification of the Family.

Schrader divided the Brachyscelidæ into three genera. As his paper is long out of print, the following extract will perhaps be very acceptable to students of the family. He says on page 6:—"I propose to divide the gall-making Coccidæ as follows:—

"1. Genus BRACHYSCELIS. Where the females have six legs completely, but short and unfit for use.

"2. Genus OPISTHOSCELIS. Where they have only two long posterior legs.

"3. Genus ASCELIS. Where there are no vestiges of legs.

"The galls of the insects of the genus *Opisthoscelis* are often found male and female under the same leaf (plate v., *n*). The female gall is in the shape of a pea, but somewhat larger; the male galls very small and conical.

"The female *O. subrotundata* (iii., *n*) is of a crimson colour, nearly round, but the terminal segment of the abdomen very much tapered; it has very long posterior legs, but no traces of the anterior and intermediary legs. In another species, *O. gracilis*, the ovipositing female is rather slender, and the legs still longer and thinner, and the male has no anal setæ. . . The larvæ resemble those of *Brachyscelis*, but have very short anal setæ. . . .

"In *Ascelis* the female larvæ alone form galls. The male larvæ undergo metamorphoses in the gall of the female. This is of pale-yellow colour, and loses nearly all traces of articulation. Only dark spots occur in place of the feet. On the back the animal has a horny instrument with three points, always holding some gum between them, which seems to serve for closing up the hole. The opening of the gall is not at the top, as in *Brachyscelis*, but on the other side of the leaf. The larva (plate iii., *n*) is flat, and transparently yellow, resembling that of *Brachyscelis*, but is never pointed at the apex, has shorter antennæ and setæ, and not as much fringing hair."

All the larvæ of the three genera have six short legs.

In 1891 Mr. W. M. Maskell (Trans. N.Z. Institute. Zool., 1891, pp. 39-45, and pp. 52-60) added the genera *Frenchia* (on Casuarina) and *Carteria* (on Melaleuca) to the BRACHYSCELIDÆ, and described and figured *Sphærococcus* and *Cylindrococcus* (also on Casuarina) as of uncertain position (but has lately formed a new sub-family, IDIOCOCCINÆ, for their reception). On account of a general similarity of habit, I consider that they should also be included in the family. The first and two last form woody galls similar in structure to those of *Brachyscelis* (on Eucalypts and *Beyeria*); the second forms only thick waxy tests.

The adult female of *Frenchia* is tadpole-like, the abdominal portion being very long and slender, the thoracic very thick, circular, disk-like. Antennæ and legs absent. Colour reddish-yellow to dark brown. Larvæ elongated, flat, subelliptical, with legs and antennæ (l.c., pl. xiii.).

Of *Sphærococcus* the adult female is globular, grey in front, dark behind, with very small antennæ, but no feet. Larvæ

elliptical, elongated, abdomen rounded, with legs and antennæ (l.c., pl. viii., figs. 8-20).

Of *Cylindrococcus* (pl. ix.) the female is cylindrical, sides parallel, truncate in front, rounded behind, of red colour, antennæ short, conical, only the anterior legs developed, remainder merely indicated by dark patches. Larvæ with six long legs and two anal setæ.

In *Carteria* the thoracic part of the female is very large, subquadrate (the abdomen being very much and suddenly contracted, very much shorter than the former, and truncate), with two tubes and a horny spine dorsally, but without legs and antennæ. Colour red. The larvæ possess antennæ and long legs (l.c., pl. xii., figs. 1-10).

Mr. Maskell's descriptions and figures are exceedingly clear and painstaking, and I am very much obliged to him for his courtesy in remitting to me separate copies of his very valuable and authoritative papers.

Taking into account only what appears to be leading general characteristics, the family, as far as now known, may be synoptically epitomised as follows :—

Family BRACHYSCELIDÆ.

Females large, inhabiting through life singly woody or spongy galls of more or less regular or symmetrical form, or rarely covered only by thick, waxy tests. Male larvæ in separate small galls or associated with the females ; adults two-winged, minute.

1. Galls woody or spongy (on *Eucalyptus*, *Casuarina*, *Beyeria*).

2. Galls woody, developed in branches and twigs.

3. Female provided with legs, completely or partially.

4. Female provided with complete set of legs, three-jointed. (Body oval or fusiform ; antennæ very short ; on *Eucalyptus* and *Beyeria ?*) Brachyscelis, *Schrader.*

4.4. Female provided with incomplete set of legs, remainder indicated by dark spots. (Body cylindrical ; antennæ short, conical ; on *Casuarina.*) Cylindrococcus, *Maskell.*

3.3. Female without legs (on branchlets of *Casuarina).*

4. Body of female globular ; antennæ distinct.
Sphaerococcus, *Maskell.*

4.4. Body tadpole-like, with two tubercular appendages, and a horny spine dorsally ; antennæ absent. Frenchia, *Maskell.*

2.2. Galls spongy or leathery (on leaves of Eucalyptus).

3. Legs present in the female ; hindlegs very long, remainder obsolete. (Body round anteriorly, tapering much behind ; antennæ none.) Opisthoscelis, *Schrader.*

3.3. Legs absent. (Body subglobular, with a three-pointed horny appendage dorsally.) Ascelis, *Schrader.*

1.1. Galls not formed ; females covered by thick, waxy tests. (Thoracic part of body very bulky, abdominal short, narrow, truncate, antennæ and legs absent.) Carteria, *Maskell.*

Although the present paper is primarily concerned with the genus *Brachyscelis*, I have illustrated a species of leaf-gall (pl. iii., fig. 4) which by its external form belongs to *Opisthoscelis*, but the inhabiting insect—so far as I have been able to study it in some soaked and re-softened specimens—differs considerably from the females of that genus, and approaches *Ascelis* by the entire absence of legs. Hence I feel considerable diffidence in locating it with either, and place it only provisionally in the latter for the present, having some other species to notice in a future paper.

In the following list I have attempted tentatively to classify the galls of the genus *Brachyscelis* in regard to form and the position normally assumed by the insect during life, but the latter only applies more reliably to the species observed by myself, that of the others being inferred from the published figures, which may not have been drawn with strict regard of the position of the galls in situ, but rather to the available space. The authors rarely mention it in their remarks. In the present illustrations, which I have drawn from specimens gathered by myself chiefly, the direction of the branchlet indicates a more or less vertical one, whatever its position on the plate. (The figures of the galls of the Elder Exploring Expedition will be given on another plate with those of some others, yet undescribed in the collection at a future paper.)

LIST OF KNOWN GALLS OF BRACHYSCELIS.

A. Galls regular. (All longitudinal sections through the axis produce similar halves.)

a. Galls more or less erect.

Brachyscelis munita, Schrader. On *Euc. robusta* (Frogg.), N.S.W., Victoria, Queensland ; on *Euc. leucoxylon*, *gracilis* (Tepper), S.A.

regularis, sp. n. On *Euc. rostrata*, S.A.

subconica, sp. n. On *Euc. uncinata*, S.A.

urnalis, sp. nov. On *Euc. gracilis* (var. ?), S.A.

calycina, sp. n. On *Euc. oleosa (?)*, *dumosa*, S.A.

Neumanni, sp. n. On *Euc. dumosa*, S.A.

Beyeriæ, sp. n. On *Beyeria opaca*, S.A.

a.a. Galls lateral or dependent.

b. Galls normally lateral.

Brachyscelis pomiformis, Frogg. On *Euc.* sp., N.S.W., W.A.

oricola, Schrader. On *Euc. gracilis*, *leucoxylon*, N.S.W., Victoria.

Bäuerleni, Froggatt. On *Euc.* sp., N.S.W.

rugosa, Froggatt. On *Euc.* sp., N.S.W.

strombylosa, sp. n. On *Euc. incrassata*, S.A.

b.b. Galls more or less dependent.

Brachyscelis minor, Froggatt. On *Euc. hæmastoma*, N.S.W.

conica, Froggatt. On *Euc. viminalis*, N.S.W.

B. Galls symmetrical. (Only one section along main axis produces similar halves.)

a. Galls mostly directed laterally in the normal form and position.

Brachyscelis variabilis, Froggatt. On *Euc. piperita*, N.S.W.

pharetrata, Schrader. On *Euc. Sieberiana*, *corymbosa*, and *capitellata*, N.S.W.

Thorntoni, Froggatt. On *Euc.* sp., N.S.W.

oricoloides, sp. n. On *Euc. incrassata*, S.A.

a.a. Galls mostly dependent.

Brachyscelis duplex, Schrader. On *Euc. spec.*, N.S.W., Queensland.

pileata, Schrader. On *Euc. piperita*, *Sieberiana*, and *capitellata*, N.S.W.

glabra, sp. nov. On *Euc. rostrata*, S.A.

ellipsoidalis, sp. nov. On *Euc.* sp., Fraser Range, W.A. (Elder Exploring Expedition).

The following works have been consulted and made use of :—

1. H. L. Schrader—"Observations on Certain Gall-making Coccidæ of Australia," in Transactions of Entomological Society of N.S. Wales, 1862, vol. I., pp. 1-5. "Further Communications on the Gall-making Coccidæ," *ibid.*

2. W. M. Maskell—"Further Coccid Notes, with Descriptions of New Species, and Remarks on Coccids from New Zealand, Australia, and elsewhere," in Transactions of New Zealand Institute, 1891, I. Zoology, pp. 1-67.

3. W. W. Froggatt—"Notes on the Family Brachyscelidæ, with some Account of their Parasites, and Description of New Species," in Proceedings of the Linnean Society of N.S. Wales, Series 2, vol. VII., 1892, pp. 353-372.

DESCRIPTION OF S.A. SPECIES OF BRACHYSCELID GALLS.

Brachyscelis munita, *Schrader.*

(Trans. Ent. Soc. N.S.W., 1862; vol. I. 5; plate ii., fig. *A*, *h*, *l*, *o*, *s*.). (Plate iii., fig. 1).

The typical form as described by Schrader is shown in outline by *A*., fig. 1, plate iii., which is an approximate copy of the original figure, and has not been observed by me in South Australia. The shape usually seen is delineated by fig. 1, *B*. The four prolongations, continued along the gall as more or less crest-like ridges attain sometimes several inches in length, but are always much recurved or contracted irregularly. When occurring in crowded clusters, as is sometimes the case, the galls become mostly very much deformed. Some of the ridges or all of them become obsolete, and the appendages less in number and much reduced in length and thickness (in my opinion they probably represent midribs of four leaves composing the gall), yet the typical form can still be recognised. The variety shown at *C* (pl. iii.) appears to be rare, and only appearing solitarily. It might be distinguished as *var. foliosa*, and is only met with on very young shoots with broad leaves indicative of immature age. A form very much reduced in size occurs by no means rarely on certain "Mallee" Eucalypts (*D*, pl. iii.; fig. 2*h*., pl. iv.), which I propose to distinguish as *var. reducta* until its relationship be more closely studied.

The male galls are narrowly tubular, small, and crowded together in subglobular clusters of very numerous individuals at the ends of small branchlets.

Habitat.—Distributed throughout Southern and Eastern Australia.

Brachyscelis regularis, *spec. nov.* (Pl. iii., fig. 3, 3*a*.)

Female gall. Solitary, erect, regular, conical both ends; apex truncate, slightly narrower than the base, the stalk of which is somewhat elongated and generally attenuated as well as the apex. Aperture very small, circular, level with the narrow rim, which is slightly and very shortly annulated. Exterior nearly smooth, whitish or brownish, slightly striated and roughened by low irregular, subconical protuberances (remains of male galls?), and transverse ridgelets. Internal cavity comparatively narrow, tapering almost equally towards either end. Insect not observed. Male galls unknown.

Length of gall, 56 mm.; diameter (max.), 21 mm.

Habitat.—Murray Bridge, Lyndoch, &c. On *Eucalyptus rostrata*, Schlecht; rather rare.

Brachyscelis subconica, *spec. nov.* (Pl. iv., fig. 1.)

Female gall. Solitary or in pairs, often several or many on the same leafy branchlet, but not crowded; regular, conical on both ends, apex at first acutely pyramidal, finally obtuse, furnished with several distinct annulations. Aperture circular, mostly minute, rim very narrow. Exterior green, longitudinally striated, smooth, finally greyish-black or brown, more or less scaly rugose. Cavity cylindrical, anteriorly funnel-like, posteriorly semicircular. Female insect small, narrowly fusiform, tail-bristles moderately long.

Length of gall, 25–30 mm.: diameter do., 8–10 mm.

Male gall. Narrowly tubular, distinctly curved, rim dilated; mostly turned downwards or sideways; yellowish-green to red; either almost singly or crowded in rows on the leaves near the female galls, usually much more numerous on one surface than on the other. Insect not seen.

Length, 4–10 mm.; diameter, 1–1·3 mm.

Habitat.—Murray Bridge. On *Eucalyptus uncinata*, F. v. M.

The species is not uncommon in the Mallee scrub near the locality, and may occur elsewhere. In its erect habit, and more elongated, slender form it differs from *B. conica*, Frogg., which, according to his figures, is more or less dependent. The respective male galls present also a different habit, being developed on the leaves, while those of the latter are situated on the branchlets.

Many of the female galls are found so crowded with chalcid parasites that they become wholly unlike the original, and in some cases the originating insect has been choked, the cavity disappearing.

Brachyscelis urnalis, *sp. nov.* (Pl. iv., fig. 2.)

Female gall. Very regular, mostly solitary, rarely two to four crowded together at the ends of small twigs; urn-shaped, basal part obconical, base narrow usually (rarely incrassated), neck more or less conical, narrow, elongated; rim wide, flat, formed of obtuse, irregular, divergent lobes; inner disk slightly depressed or raised, colour mostly brown; aperture central, very minute. Exterior nearly smooth, slightly striated longitudinally, brownish green or grey. Cavity cylindrical with long narrow channel anteriorly. Female insect small, elongate fusiform, hairs long, tail bristles moderately long, very slender.

Male galls. Very small, scattered along the small twigs near the females, not crowded, conico-cylindrical, apex not dilated. Insects not seen.

	Male.	Female.
Maximum length of gall ...	2–3 mm.	18–25 mm.
Maximum length of neck ...	—	3– 8 "
Maximum diameter of gall ...	0·7–1 "	5–14 "
Maximum diameter of neck...	—	2– 3 "
Maximum diameter of rim ...	—	6– 8 "

Habitat.—Murray Bridge, South Australia.

These are the most beautifully-shaped galls known to me, and occur on a stunted species of Eucalypts allied to *Euc. uncinata* and *Euc. gracilis*, but differing from either, and not agreeing precisely with any described kind. The seed-vessels are mostly prominently four-keeled, and the rather small flowers reddish to crimson. Many of the galls are more or less abortive through excessive attack of minute hymenopterous parasites, others exhibit a large, more or less laterally placed hole, showing the exit of some larger parasite, which had fed upon the inhabitant itself. Associated with this species are found small, more or less abortive galls of *B. reducta* (pl. iv., fig. 2*h*.) The specimen shown at "a," and remarkable for its broad, clasping base, was still green when picked, and the only one of this form met with.

Brachyscelis calycina, *spec. nov.* (Pl. v., fig. 1*a–d*.)

Female gall. Solitary, rarely a few together, regular, cup-shaped, sessile on the sides or ends of branchlets, obliquely erect; base broad, sometimes an incrassated ring, gradually dilated to the irregularly dentated rim; disk depressed, an elevated small cone in the centre, exceeding the rim, and containing the minute aperture. Exterior rough, dark-brown, disk blackish. Cavity oval, channel moderately long, tubular. Insect not seen alive, in dead specimens, fusiform, about half an inch long, pale ferruginous, two last abdominal segments very slender; tail bristles black, nearly as long as the two last abdominal segments together.

Male gall. Almost cylindro-tubular, very slender, nearly straight, pale-green, rim not dilated. Scattered along and around very young twigs, never on leaves.

	Male.	Female.
Maximum length of gall ...	2 –3 mm.	15–25 mm.
Maximum diameter of base	0·7–1·0 "	4– 8 "
Maximum diameter of rim ...	—	9–15 "

Habitat.—Murray Bridge, Goolwa, Kangaroo Island.

These remarkable galls occur on stunted bushes of *Eucalyptus dumosa* and *E. oleosa*. When young and still green and immature they resemble the corresponding stage of some of the individuals of the next species, but are never crowded. They are also found occasionally much parasitised and abortive.

Brachyscelis Neumanni, *spec. nov.* (Pl. v., fig. 2*a–d*.)

Female gall. Semi-erect, aggregated in dense clusters of many individuals of both sexes, flexuose-cylindrical, base surrounded by a thicker ring, middle slightly bulging, slightly contracted below the rim, latter not much dilated, often divided into two parts by deep incisions, always irregularly dentate; disk slightly depressed,

central cone scarcely raised above the outer margin, aperture minute. Exterior reddish brown, somewhat glossy, striated longitudinally and irregularly rugulose. Cavity elongate cylindrical, base either semicircular or the lower part greatly contracted; apical channel short and more or less funnel-like. Insect not observed.

Male gall (?). Tubular to trumpet-shaped, apex much dilated, rim dentate or lobate, recurved, with a small central cone; intermixed with the female galls in the same clusters. Insect not known.

	Male.	Female.
Maximum length of gall	8 –25 mm.	18-30 mm.
Maximum diameter at base ...	1·5 "	5– 9 "
Maximum diameter in the middle	1·5– 2 "	8–10 "
Maximum diameter of the rim ...	3 – 5 "	9–11 "

Habitat.—Murray Bridge. In large clusters on the erect or suberect stout branchlets and twigs of *Eucalyptus dumosa*, causing the death of the branch on which they are situated. The species is named after my old friend Mr. J. G. Neumann, who resides at the locality named, and has always assisted me and other friends of natural history most disinterestedly in the pursuit of researches in his neighbourhood, and has also liberally contributed to the collections of the S.A. Museum.

Brachyscelis (?) Beyeriæ, *spec. nov.* (Pl. v., fig. 3*a–f*.)

Female gall. Solitary, on the end of branchlets of *Beyeria opaca*, rarely in pairs, oval, or sometimes subfusiform, composed of the fused altered leaves; apex slightly elongated, or chiefly occupied by the comparatively large aperture. Exterior greenish when alive, smooth, marked by the edges and midribs of the leaves denoted by slight ridges. Cavity elongate ovate; channel short, large. Insects not known.

Male galls. Several together along the branchlets below the female galls, minute, tubular, curved. Insect not known.

	Male.	Female.
Length of gall	1·5–2 mm.	11–22 mm.
Diameter of gall... ...	0·5–1·0 "	5– 8 "

Habitat.—Ardrosssan, Yorke's Peninsula.

This species, if it be a true *Brachyscelis*, would be the first instance of such occurring outside of the genus Eucalyptus, the plant belonging to the Euphorbiaceæ. On account of the similarity of type form of the galls, I insert it here provisionally, as the insects are unknown. Their study will probably necessitate its removal to a separate genus. The specimens from which I have draw the figure were gathered by myself in 1885.

Brachyscelis strombylosa, *spec. nov.* (Pl. iv., fig. 3*a–c.*)

Female gall. Solitary, suborbicular, sessile, often more or less oblique and turned in the direction of the branchlet. Exterior, when young, formed of numerous, subconical or subarbicular tubercules, which become more irregular with age; apex truncate, crateriform, central cone lower than the margin; aperture small, usually circular, sometimes oval. Cavity large, broadly oval, inner surface somewhat irregular, channel funnel-like, short. Insect not known. *Male galls* not observed.

Length of gall, 18–26 mm.; diameter of gall, 20–25 mm.

Habitat.—Murray Bridge. These galls occur sparingly on the stouter branches and branchlets of *Eucalyptus incrassata*, and are so firmly fixed, that they can only be detached with some difficulty, being themselves very firm and woody. The outer walls are very thick and solid, and are mined by fair-sized larvæ, apparently of some weevils. A specimen of a *Haplonyx* was doubtfully bred from one of them.

Brachyscelis ovicoloides, *sp. nov.* (Pl. iii., fig. 2*a-f.*)

Female gall. Solitary, nearly sessile, elongate oval, always curved much and obliquely away from the point of attachment, and frequently much curved dorsally (much more even than in the figure, pl. 1*a*); exterior bright-green, like the leaves, slightly wrinkled longitudinally; apex truncate, brownish, rim flat, broad, centre of disk slightly depressed, without central cone; aperture small, circular. Cavity ovate, smooth, channel short, funnel-like; walls of equal thickness throughout, and composed of three layers, viz., (1) exterior, thin, green, bark-like; (2) intermediary, thick, formed of conspicuous cavities filled with a viscous gummy substance when fresh; (3) innermost, thin, whitish, composed of longitudinal fibres.

Length of gall, 23–35 mm.; diameter, middle 13–16 mm., apex 4–7 mm.

Female insect piceous above; a pale, broad, undefined, longitudinal patch on the anterior part of the dorsum; underside dark shining brown or black, last four abdominal segments yellowish, apex brownish; anterior part of body smooth, abdomen with short, distant bristles. Head indistinct, antennæ and eyes obsolete apparently. Legs six, three-jointed; basal joint much larger than the following, terminal joint with a very minute simple claw. Anterior pair smallest, posterior largest. Terminal bristles two, very short.

Length of body, 23 mm.; of head and thorax, 13 mm.; of anterior legs, 0·6 mm.; of posterior legs, 1·5 mm.; of terminal bristles, 1 mm.; width of thorax, 10·7 mm.

Male galls. Solitary, scattered or crowded on the leaves, or

singly sometimes on the green seed-vessels; cup-shaped to tubular, thick, apex more or less dilated, green to reddish-brown.

Length, 3–6 mm.; diameter in the middle, 2·5–3·5 mm.; at apex, 3–3·7 mm.

Habitat.—Moonta, Yorke's Peninsula *(T. Jones).*

The galls are found scattered on the branchlets of *Eucalyptus incrassata*, and perhaps *E. odorata*. They appear to differ from *B. ovicola*, Schrad., by being symmetrical instead of regular in form, much more curved, and the apex almost flat, the insect itself differing in colour, size, &c. Fig. "*d*" shows the view of the inside above the dotted line of "*a*."

Brachyscelis glabra, *spec. nov.* (Pl. iii., fig. 4.)

Female gall. Solitary, sessile, considerably projecting beyond point of attachment posteriorly, ovate, nearly smooth, faintly striated longitudinally, and sometimes with irregular, smooth warts (male galls ?), whitish or grey, clouded with brown; apex rounded, aperture very minute; cavity rather large, corresponding in form with the external shape. Insect not known, nor the male galls.

Length, 28 mm.; diameter over attachment, 15 mm.; at apex, 3·5 mm.

Habitat.—Mount Lofty Ranges, Lyndoch, &c. On stout branchlets of *Eucalyptus rostrata*, but rather rare, and always solitary. The outer texture resembles that of the bark of the branches very remarkably.

Ascelis, *Schrader.*

Female without legs. Galls globular or subglobular, spongy or leathery, smooth when fresh; extending either to both sides equally, or situated wholly on one side alone, in which case the opening is through the lamina of the leaf (?).

Ascelis (?) multitudinea, *spec. nov.* (Pl. v., fig. 4.)

Female gall. Obovate orbicular (when fresh), smooth, green, wholly on one side of leaf, aperture scarcely perceptible when young, at or near summit, conspicuous when mature. Circular area at base small, depressed on opposite side of leaf.

Female insect yellow, rather flat, elliptical, slightly covered with long hairs; segments distinct, constricted, margin conspicuously lobate, head subanterior, mouth in a circular slightly protruding area; antennæ dorsal, very minute, close together, conical, blackish. Legs, none. Stigmata conspicuous as black points, slightly raised above the surface (in old and softened specimen); last segment of abdomen deeply emarginate, the sides forming thick, obtusely acuminate appendages, without bristles or setæ.

Length of gall, 8–11 mm.; diameter of gall, 6–9 mm.; length of insect, 3·5 mm.; width of insect, 2 mm.

Habitat.—Marino, South-Eastern District of South Australia.

The specimen in the collection of the S.A. Museum was presented by Mr. A. Molineux, the genial and zealous Secretary of the Bureau of Agriculture, from the above locality, in March, 1885. The numerous galls (54 in all) are distributed over a large, not quite perfect, leaf of one of the "Stringybark" gums, and arranged in short, more or less irregular, rows of three to five, but not crowded. They resemble the galls of *Opisthoscelis* in form and the position of the aperture, but the insects differ from those of the latter genus in form of body and entire absence of legs, and from those of *Ascelis*, as limited by Schrader, also in form of body and the absence of the trispinose dorsal appendage. More and fresher material is, however, required for critical examination before a conclusive decision respecting the position of the species can be arrived at.

EXPLANATION OF THE ILLUSTRATIONS.

Plate III.

Fig. 1. *Brachyscelis munita*, Schrader. Female galls. Nat. size.
A. Typical form; outline of Schrader's figure.
B. Usual form with narrow contorted appendages.
C. *Var. foliosa*, var. nov., with leaf-like appendages.
D. *Var. reducta*. Small form on mallee Eucalypts.

Fig. 2. *Brachyscelis oricoloides*, spec. nov. Male and female galls. Nat. size.
a. Normal form of female galls on twigs; young and mature form.
b, *b*, *b*. Normal form of male galls in various stages on leaves.
c. Male gall on seed vessel.
d. Dorsal half of female gall, showing form of cavity.
e, *f*. Dorsal and ventral view of female, nat. size.

Fig. 3. *Brachyscelis regularis*, spec. nov. Female gall. Natural size.

Fig. 3*a*. Abortive form of same, through parasites.

Fig 4. *Brachyscelis glabra*, spec. nov. Female gall. Natural size.

Plate IV.

Fig. 1. *Brachyscelis subconica*, spec. nov. Natural size.
a. Old, dry female gall, roughened by tubercles.
b. Living female gall, more than half-grown, showing annuli at apex.
c, *d*. Young galls in various stages (contorted).
e. Solitary; *f*, aggregated male galls.
g. Parasitised and abortive female gall, affected by Chalcids.

Fig 2. *Brachyscelis urnalis*, spec. nov. Natural size.
a. Abnormal sessile female gall.
b. Aggregated abnormal galls, distorted and bored by parasites.
c. Normal female gall (bored by a parasite at the side of the cone).
d. Young female galls.
e. Male galls on twigs.
f. Abortive female galls, affected by Chalcids.
g. Section of female gall.
h. Small abortive galls of *B. reducta*.
i. Female insect, underside.

Fig. 3. *Brachyscelis strombylosa*, spec. nov. Natural size.
a, *a*. Old female galls. *b*. Nearly fullgrown gall.
c. Section of old gall, showing peculiar form of cavity, and the tunnelling of Curculionid larvæ in the walls.

PLATE V.

Fig. 1. *Brachyscelis calycina*, spec. nov. Natural size.
a, *a*. Three mature galls, one stalked, two sessile, in various positions.
b. Three younger female galls.
c. Section of half-grown female gall, showing cavity and channel.
d, *d*. Male galls around young twigs.

Fig. 2. *Brachyscelis Neumanni*, spec. nov. Natural size.
a. Normal form of female gall.
b. Abnormal form of female gall.
c. Male galls (?) interspersed among the females.
d. Section of female gall.

Fig 3. *Brachyscelis (?) Beyerie*, spec. nov. Natural size.
a, *e*. Female galls, in various stages of growth.
d. Section of small mature gall, showing the cavity, &c.

Fig. 4. *Ascelis (?) multitudinea*, spec. nov. Natural size.
a. Mature and young galls, as appearing when dried.
b. Female gall, after being soaked in water.
c. Section of same, showing cavity and channel.
d. Female insect, natural size and magnified.

Notes and Remarks on South Australian Rhopalocera.

By J. G. O. Tepper, F.L.S.

[Read October 17, 1893.]

In part 1 of vol. XVII. of the Transactions of this Society a paper on the South Australian Rhopalocera is published by Mr. O. B. Lower, apparently intended to be a summary of what is known of the subject, frequent references being made to a previous paper published by me. As I cannot agree with many of his statements, I beg to record my views of the contested points in the order in which they occur in Mr. Lower's paper.

"It is usually considered, I believe, that the scarcity (?) of Rhopalocera in this colony is due to the great dryness during the season of flight. Also the severe droughts we are subjected to, &c. But my honest conviction is that the scarcity is due to the want of systematic collecting" (p. 1).

That the scarcity is *real* is shown by the fact that in the smaller area of Victoria 31 species of butterflies are recorded in the first part of the recently published "Victorian Butterflies," while of the corresponding families Mr. Lower only enumerates 13 species in South Australia. That this scarcity is due to physical causes is not only proved by the concurrence of all previous collectors (Messrs. Angas, Behr, Bathurst, Jung, Odewahn, Schulz, Waterhouse, Wilson Brothers, Mrs. Kraüsler, &c., beside me and my brother), but also by the corresponding scarcity of the moisture-loving ferns and mosses. The causes operate not only "during the season of flight," but chiefly upon the critical stages of larval and pupal life. Scarcity or abundance in the abstract is determined by the proportion of the number of species and individuals to a given area and time. It depends, partly upon the extremes of temperature (not the mean) which the insects or their food-plants are capable of resisting, partly upon absence or abundance of their enemies, where there are no formidable barriers of a physical nature to free intercourse between adjacent regions. The occasional capture of solitary specimens by zealous collectors only proves that the immigrants have not been able to effect a footing, or only a very temporary one. Such sporadic wanderers occur even in England and other old countries. Personal conviction is not evidence unless supported by many years of experience in the field, and

qualified by the requisite knowledge of biological, botanical, and physical science.

Delias Aganippe, *Don.*

I have seen many scores of this species in the early years of the colony, and should be able to distinguish the sexes and varieties. The figure in my "List" does not represent the female, as the comparison with any specimens will show.

Delias Harpalyce, *Don.*

The figure (4, plate iii., Trans. Roy. Soc., vol. IV.) of this *doubtfully* inserted species is badly reproduced (the right side best), and, from what I have since learned, cannot represent the above, or stand for the female of *D. Aganippe*, but more likely either for the following one or an hitherto unrecorded species or subspecies. The drawing was made in 1867 from specimens in my brother's collection before ever I thought of publishing anything, and is quite correct. Absent marks do not denote forgotten details, but absent characters in the specimens.

Delias Argenthona, *Fabr.*

This species was inserted in my list on the high authority of the late Mr. G. F. Angas, who figures the underside in "South Australia Illustrated," pl. xxxvii., fig. 2, from "the Lakes and the Coorong," and mentions that it and others had been identified by Mr. Doubleday. Surely Mr. Angas's statements are as reliable as anyone's. *Inter alia*, it may be remarked the figure on that plate differs considerably in marks and colour from my specimens of the real eastern *D. Argenthona*, and may not be this, but the kind, which from its upperside representation, I named "*Harpalyce*" (female).

Belenois Perimale, *Don. (?).*

A flight of these eastern butterflies occurred in November, 1889, and reached Adelaide, but were only about for a few days. Three specimens were secured, and are considerably abraded, as were all others seen flitting about. They resemble *B. Teutonia*, but the black and yellow of the underside is very much reduced, and the size is less. The original specimens of this species in the Museum are from the White collection and other sources, as hailing from Queensland. The specimens captured in Adelaide, &c., have to be regarded as sporadic wanderers, not as South Australian indigenes.

Callidryas Pyranthe, *Linn.*

This is undoubtedly another case of sporadic occurrence.

Danais Petilia, *Stöll.*

"Tepper calls this *D. Chrysippus*, Linn., in his list, a *widely different* species" (l.c., p. 4). Kirby and other systematists place this species close to the old world *Chrysippus*, the differences being really so slight that one is quite justified in considering them as racial varieties. George Semper says (Journ. Mus., Godefroy, part XIV., 1878):—"To establish the fact whether *Petilia* be rightly separated from *Chrysippus*, it is very desirable to know something of the first stages of the Australian form. It cannot be denied that specimens of *Chrysippus* from Morotai and Ceram approach *Petilia* very much in external appearance." Preceding the above-quoted (translated) sentence the same critical author calls them "very closely allied," the exact opposite to Mr. Lower's dictum. The species was not collected in South Australia previous to 1870, as far as I have been able to ascertain, its home being in Queensland and Northern Australia, probably owing to the absence of food-plants (Asclepiads), which subsequently became introduced as garden escapees, and should always be treated as an introduction, as well as the following.

Danais Erippus, *Cramer.*

This is a notoriously modern introduction since about 1875-1878. Kirby says that *Erippus* is a South American butterfly, while the variety *Archippus* was the most common North American form.

Xenica Achanta, *Don.*

I collected this species at Second (or Slape's) Gully in November, 1884. Subsequently I identified and exhibited specimens with others at a meeting of the Royal Society South Australia.

Pyrameis Itea, *Fabr.*

The *Stinging* Nettle (*Urtica urens*) cannot have been the original foodplant of this truly indigenous species, if it be such now, for this plant was intentionally (it is said) introduced by sheepfarmers as a fodder-plant for stock. The only native members of the Urticaceæ were the large semi-aquatic nettle of the Murray, &c., and the small common rockweed, *Parietaria debilis*. The fact that the species feeds now on the widely-spread introduced weed would account for its present abundance as compared with its scarcity inland during the earlier years.

Pyrameis Kershawi, *McCoy.*

Almost all lepidopterologists, it seems, are now agreed that this is really only a slightly diverging variety of the old *P. cardui*, which is also pointed out by Messrs. Anderson and Spry in their recently published work, "Victorian Butterflies," hence the name should be expunged.

"Dry cowdung" cannot be the proper shelter for its chrysalides for obvious reasons, but only an adaptation to circumstances where other means are absent. The species is undoubtedly indigenous, and has ever been one of the commonest. It invades even the streets of suburbs and city, owing to the safety afforded by the protective coloring of its underside.

JUNONIA VELLIDA, *Fabr.*

The spelling of "Junonisa," was copied by me from Masters' "Catalogue of Diurnal Lepidoptera" as the most recent publication at the time.

LUCIA LUCANUS, *Fabr.*

As regards the generic term, it is to be remarked that most of the genera of the *Lycaænidæ* are separated on such slight differences, that scarcely two authorities agree on the number. Hence *Cupido*, *Polyommatus*, *Lucanus*, &c., are sometimes treated separately, sometimes included in one or another or united under the old term *Lycæna* as it suits the predilection of the writer. In respect of this species Mr. Lower says, "this species has been confused with *Chrysophanus aurifer*, Blanch., a *very dissimilar* species." The qualifying terms are evidently exaggerating, as it is most unlikely that men like the late Hon. W. McLeay could confuse "very dissimilar" species, even at the most cursory glance. In Kirby's "Synonymic Catalogue of Diurnal Lepidoptera" they are placed close together, even bearing the same synonym *(Limbaria)*, hence they must be very like each other. My name, *Lycæna discifer*, was supplied by the late Hon. W. McLeay, no doubt, on account of its resemblance to that Queensland species.

The notoriously introduced Stinkwort *(Inula graveolens)* cannot be the food-plant of this indigenous species (as suggested) for obvious reasons, and the reference is therefore misleading. The mere "frequenting," *i.e.*, settling on or flying among or over the bushes, cannot amount to the deduction that such plant is the food-plant of the larvæ. The food of imagines being chiefly the nectar of flowers, they frequent all flowers provided with nectar as occasion demands, while many plants are simply used as resting places. Has anyone ever really met with insect larvæ feeding on the *Inula?* If so, the fact would be most interesting, and the insects should be fostered, bred, and protected as most valuable benefactors.

OGYRIS OTANES, *Felder* (1865).

OGYRIS IDMO, *Hewitson* (1850-52).

Comparing published figures and descriptions with specimens of either, I have little doubt that both are either identical or

only slight varieties of the same species. Kirby's inclusion of Hewitson's *O. Otrontas* with *O. Idmo* is either a misprint or mistake, and intended, it seems to me, for *O. Otanes*, as *O. Otrontas* is without the large pale spot in the forewings of the female, which is so conspicuous and characteristic a mark in both the others. For the same reasons the latter have no connection with my *O. halmaturia*, and Mr. Lower's distribution of the sexes is entirely fanciful. I have observed *O. Otanes* (identified by the Hon. W. McLeay) at Nuriootpa numerously for several seasons from 1873 to 1889, and of *O. Idmo*, Hew., is a pair in the Museum (presented by the late Mr. McDougall) from Southern Yorke's Peninsula. Having seen the sexes repeatedly *in coitu* at the former locality, I should think myself capable of distinguishing them. But at Nuriootpa I have never observed any females without the pale spot, or at Kangaroo Island any spotted ones, although for several days keenly on the hunt; but often had the opportunity of seeing the males attend or chase the unspotted females in the neighbourhood of Queenscliffe. The Kangaroo Island species, my *O. halmaturia*, differs also from *Idmo-Otanes* in coarser and more distant scales, besides form and colour.

Unless, therefore, *O. halmaturia* be identical with *O. Otrontas*, Hew., which I still doubt, not having seen specimens of the latter, I regard it as a good species on account of accurate observations in the field. The Port Lincoln specimens belong most likely also to *O. halmaturia*.

Ogyris Oraetes, *Hew.*

Ogyris Amaryllis, *Hew.*

From a careful study in the field, and a comparison of figures and descriptions, it appears to me that both these names refer to the same species. I had the opportunity for observing these butterflies on several occasions at Coromby, Victoria, where they were rather numerous, and frequenting all sorts of cultivated plants and flowers in the bright sunshine, both sexes being intermixed (*i.e.*, both "species"), and attending each other promiscuously. On the other hand I received the same forms from Southern Yorke's Peninsula, caught in the same locality, and by the same person. The female "*Amaryllis*" is distinguished by red bars on the underside of the forewings from all other species, and is so figured by Hewitson and Angas. The male "*Oraetes*," figured by Hewitson, is always found attending the former, hence the conclusion that both are the sexes of one species. The difference of the colouring of the upper side of the females is due to abrasion or its absence, and then more or less hyaline or opaque. The female being the more characteristically marked,

its name should take precedence, and "*O. Oraetes*" be relegated to the synonyms.

It is probable that *O. Amaryllis*, a native of South-Eastern Australia, only obtains a sporadic footing during favorable seasons so far west as Southern Yorke's Peninsula.

OGYRIS OLANE, *Hew.*

In "South Australia Illustrated" (plate xxxvii.) the underside of an undetermined species is figured, which is probably this species. The habit of the ants in connection with this species, as mentioned in Mr. Lower's paper, is peculiar, but I doubt whether these insects are in need of a brush for "cleaning" themselves, nature having provided them with efficient means for that purpose. The experiments recorded for testing whether a sweet secretion be the attraction are wholly inconclusive, such secretions being only discharged while feeding in health and liberty, and then usually at intervals and sparingly. More probable it is that the ants are enlisted as protectors by some peculiar faint odour agreeable to them, or resembling that by means of which they appear to distinguish their favourites and housemates, according to Sir John Lubbock and others.

Descriptions of New Australian Heterocera.

By Oswald B. Lower, F.E.S.

[Read October 17, 1893.]

MONOCTENIADÆ.

Epidesmia brachygrammella, *n. sp.*

Male, 40 mm. Head, thorax, legs, abdomen and palpi pale ochreous-fuscous; palpi four times the width of eye, beneath fuscous; pectinations of antennæ five. Forewings triangular, costa arched at base, thence almost straight, apex slightly produced; hindmargin slightly sinuate beneath apex, thence bowed oblique; light greyish-ochreous, costal edge somewhat yellowish throughout; a thick black nearly straight streak from inner-margin at one-third to middle of disc with a tooth or angulation posteriorly; a similar black streak from two-thirds of inner-margin to three-fourths across wing, curved inwards on lower half, and outwards on upper half, with indications of an anterior tooth, almost reaching tooth of previous streak; a black discal dot midway between these above middle; a row of black, paler edged dots from costa near apex to anal angle, between dots and last mentioned streak the ground-colour is clearer ochreous; a hindmarginal row of small black dots; cilia greyish-ochreous. Hindwings with hindmargin nearly straight, apex somewhat prominent; colour as in forewings, somewhat infuscated; a large suffused blackish discal dot in middle of wing; a faint suffused fuscous line beyond this cilia as in forewings.

One specimen from Mr. W. H. F. Hill, of Windsor, Victoria, taken at Croydon, Victoria. Nearest *E. hypenaria*, Gn., but distinct by the two black lines, which, however, do not quite reach the inner-margin, although indicated.

Epidesmia phædropa, *n. sp.*

Male, 32 mm. Head and thorax reddish-fuscous, face and palpi black, palpi three times the width of eye. Antennæ fuscous, basal fourth white, pectinations five. Abdomen and legs whitish, fuscous-tinged. Forewings triangular. Costa nearly straight. Apex rounded, hindmargin bowed, oblique; pale-reddish fuscous, sprinkled with blackish. Costal edge whitish throughout, beneath this a streak of reddish from base to about middle and beneath this a streak of dark-fuscous from base

to beyond middle and suffusedly continued to apex; a dark fuscous dot above inner-margin at two-fifths, another above in middle of disc, and a third beyond middle of disc; a dark fuscous streak from three-fourths of inner-margin to costa near apex, preceded by a paler shade, between this line and hind-margin the ground colour is more purplish; a row of fuscous dots from near apex to anal angle; a hindmarginal row of black dots; cilia whitish, somewhat reddish tinged, tips fuscous tinged. Hindwings with hindmargin nearly straight; dull purplish-white; a black discal dot above middle; a fuscous streak from beyond middle of inner-margin to half-across wing, anteriorly edged with paler; an indistinct subterminal line, edged with paler; hindmarginal dots and cilia as in forewings.

One specimen from Mackay, Queensland, sent by Mr. Rowland Turner. Allied to *oxydercis*, Mey., but differs by the three anterior discal dots, &c.

Onychodes heliochrysa, *n. sp.*

Female, 60 mm. Head, thorax, palpi, and antennæ dark-fawn, antennal pectinations one and a half. Abdomen and legs whitish ochreous. Forewings triangular, posteriorly dilated, costa nearly straight, apex slightly produced, hindmargin slightly sinuate beneath apex, hardly waved, bowed, oblique; dark-fawn colour, with indications of pale ferruginous patches; a purplish dot at base of wing; cilia dark ferruginous, indistinctly tinged with coppery. Hindwings with hindmargin slightly waved, rounded; bright orange; a dark fuscous hindmarginal band, narrowed towards anal angle and ending on vein 6; cilia ochreous grey, infuscated. Forewings beneath with the discal area orange; a large purplish fuscous transverse patch at end of cell Hindwings greyish, slightly ochreous tinged towards inner-margin.

A handsome species. One specimen from Woodend, Victoria. (*Coll., Kershaw.*)

GEOMETRIDÆ.

Euchloris chionoplaca, *n. sp.*

Male 34 mm. Head and thorax deep green. Abdomen deep green, apex and underside white, above with a series of three small white dorsal spots, and one much larger, suffused anteriorly with ferruginous; a white dot on middle of collar; postorbital rims white. Palpi green above, white below, terminal joint yellowish, apex of second joint white. Antennæ fuscous, pectinations four; terminal two-fifths filiform; middle and posterior legs snow-white, latter with pencil of long white hairs; anterior pair pale-brownish, with whitish tarsal rings. Forewings triangular, costa gently arched, apex rounded, hindmargin crenulate-rounded, oblique; deep grass-green, thinly scaled, and minutely

flecked with white on veins, veins outlined with darker green. Costa dark fuscous, strigulated with white, beneath which is a streak of darker green throughout; a large white spot before middle of hindmargin, followed by a transverse row of small white spots; hindmarginal line darker green, with white spots at extremities of veins; cilia green, terminal half whitish. Hindwings with hindmargin rounded, crenulate, slightly bent on vein 4; colour, hindmarginal dots and cilia as in forewings; a large white patch resting on vein 3 near hindmargin, in shape somewhat like a Maltese cross.

One specimen, Mackay, Queensland, received from Mr. Rowland Turner. Near *speciosa*, Lucas; perhaps it is the male of that species although very different, and I hardly think it possible to be the same.

SELIDOSEMIDÆ.

Selidosema zygophora, *n. sp.*

Male 38, female 42 mm. Head, legs, and antennæ ochreous-whitish. Antennæ spotted with darker; pectinations eight. Face and thorax pale ochreous fuscous. Abdomen ochreous-whitish. Forewings triangular, costa gently arched, hindmargin obliquely rounded; pale-brownish ochreous; a somewhat curved dark fuscous line from one-sixth costa to one-fourth inner-margin, but hardly reaching it, followed by a similar parallel; a short dark fuscous dash on costa before middle, suffusedly continued to inner-margin, indicating median shade; a well (darker at extaemities) blackish line from just beyond middle of costa to very near anal angle, with a strong, almost acute, angulation above middle, containing an elongate blackish transverse discal dot, which rests on lower extremity; this line is followed by a similar parallel line; a strongly dentate double-fuscous line from five-sixths costa to anal angle, leaving a narrow interspace of pale ochreous; the ground-colour between the angulated line and these lines is somewhat paler; a hindmarginal row of small black dots; cilia pale fuscous, Hindwings with hindmargin rounded; pale yellow; a small fuscous median discal dot; a suffused pale fuscous double hindmarginal line, indicating submarginal and subterminal; cilia pale yellowish-white.

Two specimens from Croydon, Victoria, taken by Mr. W. H. F. Hill, to whom I am indebted for a specimen. This species has a rather abnormal appearance, being somewhat like a *Pseudoterpna*.

Thalaina hieroglyphica, *n. sp.*

Male, — mm. Head and thorax white, slightly tinged with ochreous. Forewings with apex somewhat prominent, hindmargin

bowed, slightly waved, silvery-white ; markings light brownish, edged with dark fuscous ; a streak along basal-fourth of costa ; a streak along inner-margin from near base to anal angle ; a similar streak along submedian fold from before middle, confluent posteriorly with this and first fascia ; a narrow, nearly straight, but somewhat irregular fascia from near costa at about two-fifths to anal angle ; an irregular streak running from this fascia above middle to middle of hindmargin, somewhat interrupted before junction with second fascia ; a discal spot above anterior extremity of this ; second fascia obtusely angulated inwards near costa, running from costa at five-sixths to meet longitudinal median streak before hindmargin ; an oblique triangular-like apical mark, two oval spots on hindmargin above middle, upper confluent with apicel mark, and two others below middle ; cilia white, partially spotted with brown. Hindwings with hindmargin rounded, somewhat waved ; white ; a moderate suboval or irregular blackish-grey subapical spot. Underside of wings white, with a black subapical blotch.

One imperfect specimen bred in April, larvæ found feeding on *Acacia pycnantha*, at Blackwood, South Australia.

This species is superficially very like *inscripta*, Walk., but differs in having the discal dot, a character not shared by any other known *Thalaina*. The larva is totally different, as will be noted below. Larva of *T. hieroglyphica*—full fed, 36 mm. elongate, tapering at both ends. Head shining black, with an ochreous white blaze on each side of posterior portion, and with a few erect black hairs, face pale ochreous white. Body light-purplish black, with numerous longitudinal waved whitish ochreous fine lines, the three centre ones being thicker and more conspicuous. When in motion the larva shows two scarlet spots on the anterior portion of each segment ; when at rest they are scarcely noticeable. On the twelfth segment are two raised scarlet warty protuberances. Anal segment and claspers whitish, minutely irrorated with black ; claspers rather broadly lamelliform. A broad yellow longitudinal lateral stripe along whole length of body, edged on both sides with intense black. Spiracles black, placed on the yellow stripe, prolegs dull crimson. Belly pale emerald-green suffusedly edged with dull crimson. All segments clothed with very sparse (about twelve at most) stiff black hairs ; full-fed October. Larva of *T. inscripta*—Full grown ; length, 26 mm. Head green, with a few minute blackish scales. Body cylindrical, smooth ; yellowish green ; second segment with two bright orange-red spots, small, one on each side of dorsum placed on anterior part of segment ; a darker green, yellowish edged, moderate, continuous band throughout entire dorsal portion of body (anal segment excepted), sparsely dusted

with blackish ; on each side of this band, and parallel to it, are two pale yellowish waved lines. A very prominent ridge-like pale yellow lateral line, edged somewhat with dark fuscous, starting from one of the orange spots on second segment, and continued uninterruptedly round body and anal segment, and returning to orange spot on opposite side. Claspers pale-green. Spiracles blackish ; prolegs whitish-yellow. Abdomen beneath pale-green with three white waved lines, one in middle and one on either side, the two latter continued the whole length of body, middle line starting from posterior pair of prolegs and ending on anterior pair of true legs.

Feeds on *Acacia decurrens*, full-fed end of September, imago emerges during April.

MNESAMPELA (?) DICTYODES, *n. sp.*

Female, 50 mm. Head, legs, palpi, and thorax blackish, with a purplish tinge ; thoracic crest large, well-developed, anteriorly tinged with light reddish-purple. Thorax very woolly beneath. Palpi very long and rough, somewhat dilated towards apex. Antennæ reddish-fuscous. Abdomen greyish. Forewings elongate-triangular. Costa strongly arched towards base, sinuate beyond middle ; apex very prominent, acute. Hindmargin strongly bowed and dentate, more prominent on veins 4 and 5 ; dark purplish-fuscous, irrorated finely with blackish strigulæ, which becomes so dense on basal third as to form an almost black patch, which extends rather more or less along costa to apex and hindmargin. Cilia dark coppery-fuscous. Hindwings with hindmargin strongly dentate, light fuscous-purplish, basal half whitish ; separation well defined. Cilia fuscous, paler at base. Wings beneath light dull-purplish, with a large, black, apical patch on all wings, that on hindwings more pronounced.

One specimen, bred by Mr. G. Lyell, jun., Gisborne, Victoria.

This is a curious and striking insect, and will possibly require a new genus when the male is known. In general appearance it reminds one of *Stathmorrhopa beggaria*, Gn. The form of wing and palpi are noticeable characters.

STIBAROMA PLAGIOSEMA, *n. sp.*

Male, 40 mm. ; female, 48 mm. Head, palpi, thorax, legs, and abdomen ashy grey-whitish. Thorax with two narrow, transverse, black bands, meeting in middle. Abdomen with black rings, edged with white. Antennæ fuscous, pectinations four. Forewings elongate triangular. Costa gently arched, more so in female ; hindmargin hardly waved, rounded, oblique ; ashy-grey-whitish, densely strewn with dark-fuscous scales, in the male with some obscure fuscous-reddish patches ; markings black ; a narrow

outwards curved line close to base ; a second, curved from one-fifth costa to about one-third inner-margin ; a third, more obscure, from before middle of costa to middle of inner-margin, dentate inwards on lower half ; a fourth from before three-fourth of costa to beyond two-thirds of inner-margin, bent inwards on lower half ; an elongate spot in disc above middle, between third and fourth lines, near fourth ; a fine waved blackish hindmarginal line ; cilia white, with black points at extremities of veins. Hindwings with hindmargin irregularly waved, rounded ; whitish in male, darker in female ; a black discal dot ; a fine waved line, blackish, from three-fourths costa to near anal angle ; a suffused blackish hindmarginal band darker anteriorly ; hindmarginal line and cilia as in forewings. Markings of hindwings more strongly defined on underside. The present is intermediate between *melanotoxa*, Meyr., and *trigramma*, Lower, but nearer the latter. This and the two above-mentioned form a closely-connected group.

Gisborne, Victoria.

XYLORYCTIDÆ.

Plectophila placocosma, *n. sp.*

Female, 14 mm. Head and thorax snow-white, palpi and antennæ dark fuscous, terminal joint of palpi and an apical ring of second joint white ; basal joint of antennæ whitish. Abdomen and legs yellow, anterior and middle tibia mixed with fuscous. Forewings moderate ; costa gently arched, apex obtuse, hindmargin obliquely rounded ; white, slightly ochreous tinged ; a broad dark fuscous fascia suffused on lower half, anterior edge curved from one-sixth costa to one-sixth inner-margin ; a large irregular fuscous patch on costa beyond middle, reaching more than half across wing, anterior edge preceded by a blackish discal spot ; a large fuscous patch on hindmargin from apex to anal angle ; a fuscous hindmarginal line, separated from preceding patch by a streak of ground-colour ; cilia yellowish, with a fuscous apical spot. Hindwings yellowish, with a broad fuscous suffusion occupying posterior two-thirds of wing ; cilia yellowish, with a blackish line, double at apex.

Sydney, New South Wales. One specimen from Mr. W. W. Froggatt.

ŒCOPHORIDÆ.

Philobota pentamera, *n. sp.*

Female, 22 mm. Head dark fuscous, palpi and thorax white, thorax with a narrow fuscous anterior band, terminal joint of palpi externally fuscous. Legs and abdomen ochreous-yellow, anterior legs infuscated. Forewings moderate, costa arched,

more strongly at base, apex obtuse, hindmargin rounded oblique ; a broad dark fuscous fascia almost from middle of costa to middle of inner-margin, anterior edge with a short projecting tooth in middle, posterior edge somewhat suffused ; the ground-colour between fascia and base is white, faintly ochreous tinged, except a short fuscous streak on costa at base ; the colour beyond the posterior edge of fascia is bright yellow, except a broad dark-fuscous hindmarginal band, which contains an ill-defined yellow spot in its lowest extremity ; the median third of this band projects so as to nearly touch the median fascia ; cilia bright yellow, at anal angle dark fuscous. Hindwings with the hindmargin rounded ; yellow ; a fuscous hindmarginal band, broadest at apex, and not reaching anal angle ; cilia yellow, infuscated towards median third.

One specimen from Gisborne, Victoria, received from Mr. G. Lyell, jun. This species is in the neighbourhood of *ophiodes*, Meyr., and *sigmophora*, Meyr., but nearer the latter.

Casyra Kershawi, *n. sp.*

Male and female, 16 and 17 mm. Head and palpi yellow, thorax and abdomen purplish-fuscous. Legs and antennæ dark fuscous, antennæ annulated with ochreous, posterior legs ochreous tinged. Forewings moderate, costa gently arched, apex obtuse, hindmargin rounded oblique ; bright-ochreous yellow ; a narrow fuscous purple basal fascia ; a hindmarginal band of purple-fuscous, occupying apical two-fifths of wing, darker on margins, and containing a roundish spot of ground-colour on costa ; cilia purplish-fuscous, with a darker median line, tips paler. Hindwings with hindmargin rounded ; dark bronzy-fuscous ; cilia bronzy-fuscous.

Four specimens, Springvale, Victoria, received from Mr. J. A. Kershaw, to whom the species is dedicated. It is nearest *dichroella*, Zeller, but narrower winged, and separable by the spot of ground-colour in band.

NOTE.

Euproctis pelodes, Trans. Roy. Soc., S.A., p. 150, vol. XVII, 1893. The size is 25 mm.

Sterrha aglaodesma, p. 157, l.c. The size should be 21 mm

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October 17, 1893.]

XIV.

CARABIDÆ.

XANTHOPHŒA.

X. satelles, sp. nov. Elongata; nitida; brunneo-testacea, antennis palpis pedibusque dilutioribus, elytris et prothorace (ut *X. infuscata*, Chaud.) piceo-vittatis; prothorace quam latiori fere longiori, lateribus antice minus fortiter rotundatis postice fortiter sinuatis, angulis posticis acutis sat fortiter extrorsum directis; elytris punctulato-striatis, interstitiis sparsim subtiliter punctulatis, 3° puncturis setiferis 4 instructo. Long., 4 l.; lat., $1\frac{1}{5}$ l.

Resembles *X. infuscata*, Chaud., and *X. angustula*, Chaud., but differs from them both in having no setiferous punctures on the fifth interstice of the elytra. Differs from *infuscata* also by its narrower and more elongate form (the prothorax by measurement scarcely so wide as long); and from *angustula* by the hind angles of its prothorax more strongly directed outward.

S. Australia; Eyre's Peninsula.

X. filiformis, sp. nov. Elongata; angustissima; nitida; testacea, sutura plus minusve infuscata, capite prothorace antennisque rufescentibus; prothorace leviter transverso, lateribus antice modice rotundatis postice sinuatis, angulis posticis acutis parvis extrorsum minus evidenter directis; elytris punctulato-striatis, interstitiis sparsim subtilissime punctulatis, 3° puncturis setiferis 3 instructo. Long., $3\frac{1}{2}$ l.; lat., 1 l.

Even narrower and more elongate than the preceding. Coloured quite differently from *infuscata*, *angustula*, and *satelles*, and differing from them also *inter alia* by the much finer puncturation of its elytral interstices, and from the former two by the absence of setiferous punctures on the fifth interstice. The three punctures on the third interstice will distinguish it from *lissodera*, Chaud., *parallela*, Chaud., and *ferruginea*, Chaud.

S. Australia; Goat Island, off Goolwa.

SILPHOMORPHA.

S. rufoguttata, sp. nov. Nitida; atra, macula in utroque elytro magna antemediana pedibus abdomineque rufis; corpore supra sat subtiliter nec crebre punctulato; elytris prope marginem lateralem longitudinaliter sulcatis. Long., $2\frac{2}{3}$ l.; lat., $1\frac{1}{3}$ l.

The upper surface in colour and markings resembles *P. biplagiata*, Cast., but the spots on the elytra are nearer the base. The species is much more nitid, and very much smaller than *biplagiata*. It should stand, I think, nearer *Castelnaui*, Reiche., compared with which the reflexed margin of the prothorax is wider, the surface is (not impunctate, but) quite distinctly punctulate, the elytra are sulcate near the lateral margin, and the markings are quite different.

N. Queensland; taken by Mr. Cowell.

PHALACRIDÆ.

LITHOCRUS.

L. consors, sp. nov. Sat breviter ovalis, postice sat angustatus; nitidus; testaceus, supra capite prothorace et elytrorum maculis (altera magna trifida basali, altera cordiformi communi postmediana) nigris; capite prothoraceque vix perspicue punctulatis; elytris (stria suturali postice excepta) haud striatis vix perspicue seriatim punctulatis. Long., $\frac{4}{5}$ l.; lat., $\frac{1}{2}$ l.

Resembles *L. læticulus*, Blackb., but differs from it by smaller size, elytra without a trace of striæ except the sutural stria on the hinder part of each elytron, and somewhat different markings of elytra; which consist of (1) a blotch covering the base and sending out a broad triangular median extension with its apex on the suture a little in front of the middle, and also a narrower branch (brownish rather than black) running hindward along the lateral margin of each elytron; (2) a small common cordiform spot a little behind the middle.

N. Queensland; taken by Mr. Cowell near Cairns.

BUPRESTIDÆ.

STIGMODERA.

S. terræ-reginæ, sp. nov. Fem. Sat depressa, minus elongata, fere glabra (corpore subtus sparsim breviter pilosa); corpore subtus (prosterni lateribus rufis exceptis) capite antennis scutello pedibusque læte viridibus; prothorace nigro-cyaneo, margine antico viridi, lateribus late rufis; elytris rufis, basi suturaque (anguste), parte apicali quinta, macula magna communi a basi ultra medium producta, et macula subro-

tundata postmediana marginem lateralem nec suturam attingenti, nigro-cyaneis ; capite longitudinaliter sulcato, inæqualiter punctulato, clypeo antice emarginato ; prothorace quam longiori (et postice quam antice) vix duplo latiori, longitudinaliter (fere ut *S. gibbicollis*, Saund.) convexo, fortiter (in medio minus, ad latera magis, crebre) punctulato, lateribus sat fortiter rotundatis, latitudine majori pone medium posita ; elytris punctulato-striatis, basi sat fortiter (fere ut *S. gibbicollis*, Saund.) antrorsum productis, apice singulatim oblique emarginatis 2-spinosisque, lateribus postice sat fortiter denticulatis, interstitiis (apice summo excepto) vix convexis crebre vix subtiliter (fere ut *S. flavæ*, Saund., sed paulo minus subtiliter) punctulatis ; corpore subtus subtilius minus crebre (prosterno medio magis fortiter) punctulato. Long., 7 l.; lat., 3 l.

The prothorax resembles that of *S. gibbicollis*, Saund., in build ; the elytra having the somewhat depressed form (incurved behind the shoulders, and at their widest behind the middle) of *S. undulata*, Don. The close comparatively strong puncturation of the elytral interstices is a conspicuous character. The markings are not much like those of any other described *Stigmodera ;* regarding the red colour as the ground of the upper surface, the bluish-black marks are a long oval discal patch commencing on the front margin of the prothorax, and continued backward to behind the middle of the elytra, a large roundish spot on each elytron behind the middle (touching the lateral margin, but not the suture), the apical one-fifth of the elytra and the suture between the discal patch and the dark apex.

N. Queensland ; in the collection of C. French, Esq.

ELATERIDÆ.

HETERODERES.

H. cairnsensis, sp. nov. Sat elongatus ; minus depressus ; fusconiger, pube brevi pallide fulva vestitus (pube ad prothoracis basin magnam plagam triangularem denudatam simulanti), oris membris antennarum basi prothorace versus angulos posticos pedibusque pallide testaceis ; antennis (maris ?) prothoracis basin vix superantibus, articulo basali quam 2us 3us que conjuncti parum breviori, hoc quam ille sat longiori quam 4us sat breviori ; capite haud carinato ; prothorace quam trans angulos posticos latiori vix longiori, dupliciter punctulato ; in medio longitudinaliter concavo, angulis posticis carinis singulis (his sat elongatis a margine laterali modice divergentibus) instructis ; elytris punctulato-striatis, ad apicem rotundatis, interstitiis sat planis. Long., $3\frac{1}{2}$ l. ; lat., 1 l.

This species is remarkable by the curious appearance (apparently constant) of the pubescence on the prothorax, which to a casual glance seems to be wanting in such fashion as to leave a large denuded triangle with its base on the base of the elytra and its apex a little behind the middle of the disc; but on careful examination this seems to be due to the median sulcus in combination with the posterior declivity causing the light to fall unequally on the surface. The insect differs from *H. carinatus*, Blackb., *inter alia* by its non-carinate head, and from *albidus*, Macl., by the prothoracic character mentioned above, and by the third joint of the antennæ being considerably shorter than the fourth.

N. Queensland; taken near Cairns by Mr. Cowell.

TENEBRIONIDÆ.

PLATYDEMA.

P. victoriense, sp. nov. Ovale; subtus piceo-ferrugineum, supra variegatum, capite prothorace (hoc ad latera plus minusve rufo) antennisque (articulis basalibus 3 vel 4 rufis) piceis, elytris læte rufis macula magna communi rotundata in medio disci posita ornatis, pedibus plus minusve rufescentibus; antennis sat brevibus sat crassis (magis brevibus magis crassis quam *P. tetraspilotæ*, Hope); capite sat crebre subrugulose, prothorace minus crebre haud rugulose (quam *P. tetraspilotæ*, Hope, manifeste minus crebre) punctulato; hujus figura fere ut *P. tetraspilotæ*: elytris fortiter punctulato-striatis, interstitiis sat convexis sat sparsim punctulatis. Long., $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

Slightly longer and wider than *P. tetraspilota*, Hope, which it resembles much in colouring, but the blackish colour on the elytra (instead of forming a fascia reaching the lateral margin on either side) forms a large common roundish oval spot separated from the lateral margin on either side by three or four interstices. Compared with *P. tetraspilota*, the present species has shorter and thicker antennæ, prothorax considerably less closely and evidently more strongly punctured, elytral interstices more convex and more strongly and less closely punctured. The head is devoid of a horn in all the examples before me, one of which I believe to be a male.

Victoria.

CURCULIONIDÆ.

(OTIORHYNCHINI.)

APIROCALUS.

A. cornutus, Pasc. Among some *Curculionidæ* taken by Mr. Froggatt, and sent to me for identification, I find two specmens

ticketed "N.-W. Australia," which I am unable to distinguish from examples of *A. cornutus* that I have received from New Guinea. The genus is remarkable among its near allies for its anterior coxæ not being contiguous, as well as for the very peculiar shape of its elytra, and has not previously been reported as Australian

LEPTOPSINI.

CHERRUS.

C. ocularis, sp. nov. Mas. Modice elongatus; piceus, indumento fusco dense tectus, oculis squamis niveis circumcinctis, pedibus et corpore subtus (præsertim maculis in abdomine nonnullis) hic illic squamis setulisque griseis vel albidis variegatis; rostri sculptura ut *C. ruficornis*, sed sub indumentum vix manifesta; antennis minus gracilibus, funiculi articulo basali quam 2us 3us que conjuncti paullo breviori; prothorace quam elytra fere latiori, quam longiori fere dimidia parte (postice quam antice circiter quarta parte) latiori, supra sat planato tuberculis sat elevatis sat inæqualibus plus minus crebre ornato, lateribus sat fortiter ampliato-rotundatis, lobis ocularibus fortiter productis; elytris quam prothorax vix duplo longioribus, ad basin quam prothoracis basis haud latioribus, mox pone basin constrictis, hinc ad apicem ovalibus, minus convexis ad latera abrupte verticalibus, parte dorsali haud manifeste striata plus minusve distincte seriatim punctulata et tuberculis nonnullis sat magnis seriebus binis dispositis (granulis nonnullis minus ordinatis intermixtis) ornata, parte verticali punctulato-striata (interstitiis convexis), humeris sat acute productis.

Femina latet. Long., 7 l.; lat., $2\frac{4}{5}$ l.

Very distinct from its previously described congeners by the snowy-white scales round the eyes, which seem to be constant, as well as by the conspicuous spots of whitish scales on the abdomen. As in the other tuberculate *Cherri* (so far as I have observed them) the tubercules on the prothorax and elytra are alike in but few specimens. Those on the prothorax are distinctly isolated *inter se*, not confluent or vermiculate (as they are in *plebeius*, &c.), and are generally arranged in clusters, leaving large free spaces, but in some examples are more evenly distributed. On each elytron in most individuals there are two rows of large isolated tubercles (about where the third and fifth interstices might be), varying in number from three or four to about eight; and there are also a number of well-defined isolated granules, sometimes running in rows, sometimes much confused. The tubercles vary much in size. To the eye the prothorax appears wider than the elytra. I have taken the "length of the

elytra" to be the same as the "length of the underside from the front of the intermediate coxæ hindward." The fuscous indumentum covers the whole upper surface in all the examples I have seen. I have removed it with some difficulty from one example, and find that the derm is very nitid with rows of large punctures on the elytra.

Victoria.

C. ruficornis, sp. nov. Mas. Sat elongatus; piceus, indumento squamoso pulverulento silaceo vestitus, antennis (clava excepta) læte rufo-testaceis; rostro sat nitido crebre sat subtiliter punctulato, quam caput paullo longiori nec angustiori, supra profunde canaliculato (canali in frontem continuato, in fundo carina antice triangulariter dilatata instructo), prope basin utrinque sulco oculum fere attingenti impresso; capite prothoraceque subtillissime confertim punctulatis et puncturis majoribus nonnullis impressis; hoc sulcis brevibus foveisque sparsim confuse notato (his in exemplis nonnullis magis profundis et crebrius dispositis sic ut prothorax plus minusve tuberculatus videtur); antennis sat elongatis, funiculi articulo basali quam 2us 3us que conjuncti vix breviori; prothorace quam elytra sat latiori (exemplorum nonnullorum vix latiori), quam longiori plus quam tertia parte latiori, antice fortiter angustato, lateribus fortiter ampliato-rotundatis, lobis ocularibus fortiter productis; elytris quam prothorax vix duplo longioribus, ad basin quam prothoracis basis haud latioribus, pone basin plus minusve constrictis, hinc ad apicem elongato-ovalibus, ad latera abrupte verticalibus, parte dorsali geminatim punctulato-striata (interstitiis inter parium strias haud vel leviter convexis, inter paria fortiter costatis), parte verticali punctulato-striata (interstitiis minus convexis); pedibus anticis fortiter elongatis. Long., $6\frac{1}{2}$ l.; lat., $2\frac{4}{5}$ l.

Femina. Multo magis robusta, elytris quam prothorax sat latioribus; fortiter convexa; sculptura tota magis crassa, pedibus anticis sat brevibus. Long., 7 l.; lat., $3\frac{4}{5}$ l.

Like most of its congeners, this species is so variable that it is difficult to find two specimens identical *inter se* in respect of sculpture, &c. In some examples the sulci on the prothorax are few and lightly impressed, while in others they are so deep and numerous that the surface appears profoundly vermiculate-rugulose; in some the interstices separating the two striæ of each pair on the elytra are quite flat, while in others they are more or less convex; in some the elytral costæ are quite smooth, while in others they are more or less uneven; in some males the prothorax is scarcely wider than the elytra, while in others it is

considerably wider. The species may, however, be known from all its described congeners by its bright testaceous-red antennæ.

S. Australia.

ERIRHININI.

This tribe of *Curculionidæ* is represented in Australia by a very great number of genera and species. Its metropolis appears to be the southern and western portions of the continent; very few species have been found in the North and North-East. The Australian *Erirhinini* present extreme difficulty in classification on account of the existence of species in which the distinctive characters of the tribe gradually disappear, so that it is impossible to characterise the tribe in terms that will distinguish it sharply from all the allied tribes. Thus, Mr. Pascoe described several genera as *Erirhinini*, in which the pectoral canal of the *Cryptorhynchini* is present in a modified form, and which he subsequently thought ought to be transferred to the latter tribe; the genus *Eniopea* of the same author is characterised as having a true exposed *pygidium*, which would place it very far away from the tribe as M. Lacordaire characterised it, and *Orichora* (now placed among the *Tychiini*) was originally characterised by the same author as an *Erirhinid*. I have lately been studying a fairly large number of species of this and allied tribes, and have endeavoured to bring them into something like order.

The *Erirhinini* belong (in M. Lacordaire's classification) to Section B. of Phalanx I., in the aggregate of *Curculionidæ* which is called "Curculionides Phanerognathes Synmerides," and which is distinguished by the following characters:—Mentum not concealing the mouth organs, front coxæ contiguous, pygidium not visible, claws simple (*i.e.*, not dentate, appendiculate, or bifid), metasternum not very short, its episterna not very narrow. From the rest of the *Curculionidæ* possessing the above characters M. Lacordaire distinguishes the *Erirhinini* by the following characters in combination; antennæ geniculate, mesothoracic epimera not visible from above, submentum furnished with a peduncle, pronotum not distinct from the flanks of the prosternum, mandibles not (or scarcely) prominent, third joint of the tarsi not enormously dilated with the form of a palette, rostrum more or less elongate and slender and not of abnormal shape, tibiæ not of the strongly compressed form they take in the *Hylobiini*, corbels of the hind tibiæ open.

I think all species agreeing with the above diagnosis ought to be accounted *Erirhinini*, irrespective of the question whether their facies may happen to resemble that of another tribe, and that none making default of any of the characters mentioned above ought to be admitted. Consequently I am of opinion that Mr. Pascoe's second thoughts were not the best in removing

certain genera on account of their having the front part of the prosternum concave (as in the *Cryptorhynchini*), inasmuch as their front coxæ are contiguous, in spite of the prosternal concavity. If *those* genera must be eliminated others (*e.g.*, *Storeus*, *Bagous*, and *Emplesis*) must follow, and the character is itself so variable even within the limits of a genus as not to appear of importance higher, at any rate, than generic. The characters I have mentioned above as M. Lacordaire's seem to be really capable of more than generic application, although I cannot deny that some at least even of these are subject to *slight* modification. Thus there are species in which the pygidium is exposed *in the male only*, but I think their pygidium being covered in one sex may fairly relegate them to the *Erirhinini* (with which they agree in other characters); and there are abnormal species in which the front coxæ are not quite contiguous, but in every case these, I think, are so manifestly even *congeneric* with species having the front coxæ contiguous that it would be impossible to treat the peculiarity as more than abnormal.

In the next of this series of memoirs I hope to give a tabulation of all the Australian genera of *Erirhinini*, the tribe having now become so unwieldy that such an aid to its classification seems sorely needed. The present memoir contains the description of a part of the large mass of new genera and species in my hands, and I hope to complete the description of them in the next memoir of the series.

I have to acknowledge with much gratitude the extremely valuable assistance I am receiving in the preparation of these articles on *Erirhinini* and other *Curculionidæ* by the co-operation of George Masters, Esq., the author of the "Catalogue of Described *Coleoptera* of Australia" (a work of the very highest importance to Australian students), who is allowing me to examine his collection of authentic types of Mr. Pascoe's genera. I have also to thank several workers (especially Messrs. French, of Melbourne, and Lea, of Sydney), for placing their collections of *Curculionidæ* at my disposal.

AOPLOCNEMIS.

A. tasmanicus, sp. nov. Mas. Angustus; elongatus; nitidus; rufus, nonnullorum exemplorum pedibus piceis, corpore subtus toto prothoracis linea media scutello et in elytris maculis nonnullis dense niveo-squamosis; rostro quam prothorax sat longiori, punctulato, ad latera sat fortiter supra in medio obsolete strigato; antennis sat elongatis, funiculi articulo basali quam 2us manifeste breviori; prothorace quam latiori longiori, leviter nec crebre ruguloso-punctulato; elytris striatis, striis puncturis magnis quadratis instructis, interstitiis sat fortiter convexis. Long. (rostr. incl.), $5\frac{3}{4}$ l.; lat., $1\frac{3}{5}$ l.

This species is distinguished by its narrow elongate form, its prothorax being to the eye considerably (and by measurement slightly) longer than wide. Its prothorax has no white squamosity on the upper surface except the median line. Compared with *A. phaleratus*, Er., its rostrum is evenly convex above with scarcely distinct longitudinal sculpture, the prothorax is more feebly and much less closely rugulose. The white markings formed by scales on the elytra are a blotch behind the scutellum, a spot on each side of the suture about the middle of its length, two spots close to each other on the lateral declivity slightly in front of the middle, a marginal vitta in the hinder half, and a vitta running forward (from the apex) on the disc to near the middle of the length, and ending about half-way between the suture and lateral margin.

Tasmania; given to me by A. Simson, Esq.

SYMBOTHINUS (Proc. Linn. Soc., N.S.W., 1890, p. 582).

S. puer, sp. nov. Sat elongatus; piceus, squamis umbrinis et nonnullis albidis (his in prothorace indeterminate trivittatim, in elytris maculatim, dispositis) vestitus, corpore subtus sat dense albido-squamoso; rostro supra æquali, quam prothorax paullo longiori; hoc vix transverso, crebre sat fortiter rugulose, lateribus parum rotundatis; elytris vix striatis, striis sat fortiter punctulatis, interstitiis vix convexis; corpore subtus sat crasse punctulato; tarsorum articulo apicali minus exserto. Long., 1 l.; lat., $\frac{1}{3}$ l.

Much smaller than *S. squalidus*, Blackb., with the legs and antennæ of dark colour; the rostrum scarcely showing any trace of longitudinal sculpture, the prothorax less rounded laterally, the elytra marked with numerous small spots of whitish scales, which are somewhat evenly distributed (not most conspicuous at the shoulders), the apical joint of the tarsi less exserted, &c.

N.S.W.; Glen Innes. Mr. Lea.

OLBIODORUS (gen. nov., *Erirhininarum*).

Corpus squamosum et capillis erectis elongatis vestitum; rostrum sat elongatum (maris quam feminæ brevius) modice robustum, minus arcuatum, subcylindricum; scrobes flexuosæ, laterales, (maris multo, feminæ vix) ante medium rostrum positæ; scapus oculum vix attingens; funiculus 7-articulatus; oculi parvi rotundati, tenuiter granulati; prothorax breviter subconicus, basi vix bisinuata, lobis ocularibus nullis; scutellum minutum; elytra prothorace fere duplo latiora, subquadrata; prosternum antice sat fortiter emarginatum, ante coxas breve; coxæ intermediæ approximatæ; femora mutica; tibiæ anticæ apicem versus falcatæ; tarsorum

articuli basales 3 breves, his conjunctis quam articulus 4us haud longioribus, 3^{s} bilobo; unguiculi sat magni, divergentes; segmentum ventrale 2um quam 3um 4um que conjuncta brevius, ultimo brevi, suturis sat rectis.

The front tibiæ passing gradually at the apex into the mucro, which thus becomes a continuation of the tibiæ, will distinguish this genus, I think, from all the other Australian *Erirhininæ* except *Œnochroma* from which it differs *inter alia* by the much shorter basal joints of its tarsi.

O hirsutus, sp. nov. Sat brevis; rufus vel rufo-testaceus, rostri apice summo nigro; squamis concoloribus et nonnullis albidis intermixtis (his plus minusve distincte vittatim in prothorace elytrisque condensatis) totus densissime vestitus et capillis erectis valde elongatis (alteris albis alteris nigris) instructus; rostro quam prothorax (maris vix, feminæ manifeste) longiori, sat robusto, parum arcuato, supra reticulatim strigato; antennis modice elongatis, funiculi articulis basalibus 2 elongatis ceteris brevibus inter se sat æqualibus; prothorace crebre sublongitudinaliter ruguloso-punctulato; elytris quam prothorax multo latioribus, leviter striatis, striis puncturis sat magnis (his minus crebre dispositis) impressis, interstitiis vix convexis, humeris obtusis. Long. (rostr. incl.), 2$\frac{1}{5}$ l.; lat., 1 l.

The facies of this insect is much like that of *Nedyleda* (as figured in Journ. Linn. Soc., 1872, t. 12, fig. 9), but the sides of its elytra are less rounded. The rostrum is much like that of a *Rhachiodes* (e.g., *R. granulifer*, Chev.), although that of the male is shorter than of any male *Rhachiodes* known to me. The vestiture is much like that of *Olanæa*, but the erect hairs are much longer than in any *Olanæa* that I have seen. The tarsi are like those of *Desiantha*, except in the claws not being divaricate. The squamosity is so dense as entirely to hide the sculpture, which I have described from an abraded specimen.

S. Australia; Eyre's Peninsula.

PLÆSIORHINUS (gen. nov. *Erirhininarum*).

Sat elongatus; minus dense squamosus; rostrum elongatum (maris quam feminæ brevius) sat gracile, arcuatum, quadrangulare; scrobes laterales paullo obliquæ, ante medium rostrum positæ; scapus oculum vix attingens; funiculus 7-articulatus; oculi modici, sat tenuiter granulati; prothorax parum transversus subcylindricus, basi subtruncata, lobis ocularibus distinctis; scutellum distinctum; elytra quam prothorax sat latiora, elongato-obovata; prosternum antice sat fortiter emarginatum, ante coxas minus elongatum; coxæ intermediæ approximatæ; femora mutica; tibiæ anticæ

ad apicem bicalcaratæ (nonnullorum exemplorum calcare uno carenti; ? abrupto); tarsi elongati, articulo 3° bilobo, 4° quam 1us vix longiori; unguiculi divergentes; segmentum ventrale 2um quam 3um 4um que conjuncta longius, quam ultimum brevius, suturis intermediis ad latera angulatis.

The facies of this genus is very much like that of *Aoplocnemis*, from which it differs by its quadrangular (in transverse section) rostrum with lateral scrobes, its prosternum notably shorter in front of the coxæ, the shorter third and fourth segments and the longer fifth segment of its abdomen; its intermediate ventral sutures distinctly produced hindward at the sides, its bi-calcarate front tibiæ resembling those of *Hedyopis*, &c. The additional mucro of the front tibiæ must, I think, be easily broken off, as it is wanting on one tibia in one of the examples before me, and on both in another example. The quadrangular form of the rostrum is also found in *Nemestra*, but the rostrum of that genus is very much more robust, and it differs also in many other characters.

P. notatus, sp. nov. Minus nitidus; rufus, corpore subtus et antennarum clava infuscatis; squamis niveis ornatus, his in prothorace vittas 2 (in elytris breviter continuatas) et in elytris fascias singulas obliquas postmedianas nec latera nec suturam attingentes formantibus; rostro quam prothorax (maris vix, feminæ manifeste) longiori, ad basin punctulato et longitudinaliter striato, antice fere lævi; antennis sat elongatis, funiculi articulis 1° 2° que conjunctis (hoc quam illo longiori) quam ceteri conjuncti vix brevioribus; capite prothoraceque sat grosse punctulatis; elytris sulcato-punctulatis, interstitiis subcostatis, subtiliter granulatis, humeris obtusis. Long. (rostr. incl.), 2–2½ l.; lat., ⅘–9/10 l.

S. Australia.

N.B.—A Victorian example, in very bad condition, is probably a variety, differing in the much longer fascia of the elytra, which almost reaches both suture and lateral margins.

DESIANTHA.

D. vittata, sp. nov. Oblonga; nigra; antennis (clava excepta) pedibusque plus minusve rufescentibus, supra squamis piceis griseo-brunneisque intermixtis vestita (his in prothorace trivittatim dispositis, in elytris interstitia alterna vestientibus); rostro robusto quam prothorax vix longiori, longitudinaliter sat fortiter strigato; funiculi articulo basali quam 2us vix longiori; prothorace leviter transverso crebre ruguloso; elytris sat fortiter punctulato-striatis, interstitiis alternis leviter convexis; tibiis anticis intus subtiliter denticulatis. Long. (rostr. incl.), 2¾–3 l.; lat., 1–1⅕ l.

Maris metasterno postice et segmentis basalibus 2 longitudinaliter sulcatis ; elytris ad apicem simplicibus.

Feminæ corpore subtus haud sulcato; elytris singulis ad apicem ut processus conicus productis.

This species seems to be near *D. caudata*, Pasc, but that insect is described as "pale ferruginous" in colour, and there is no remark on its elytral interstices being of alternately different colours. In my tabulation of the species of *Desiantha* (P. L. S. N.S.W., 1890, p. 326) this one falls beside *D. obscura*, from which the pale brown vittæ on its elytra at once distinguish it.

Victoria.

D. pusilla, sp. nov. Minus elongata; picea, squamis sordide brunneis vestita, pedibus (tarsis exceptis) et antennis (clava excepta) plus minusve rufescentibus ; prothorace minus subtiliter vix confertim vix rugulose punctulato ; elytris punctulato-striatis, interstitiis convexis (nonnullis quam cetera magis elevatis), setulis (retrorsum curvatis) ornatis, interstitiis 4° 5° 6° que postice conjunctis manifeste nodulosis.

Maris metasterno et segmentis basalibus 2 sulcatis ; rostro brevi, sat crasso, longitudinaliter sat distincte strigato. Long., $1\frac{3}{5}$ l.; lat., $\frac{1}{2}$ l.

This species is extremely close to *D. parva*, Blackb., but I think it is distinct. The male is much smaller than the male of *D. parva*, and is evidently less parallel and wider ; its rostrum is distinctly shorter and stouter with its upper surface distinctly sculptured, having three quite well-defined fine longitudinal lines on each side of the central line (whereas in *D. parva* the central line alone is clearly traceable) ; the antennæ are a little shorter and stouter.

The two or three examples (all males) that I have seen are more or less clothed with a dirty indumentum, the removal of which takes off the scales also, so that I am unable to give a satisfactory description of the colours in a well-marked specimen, but as far as I can judge the lighter-coloured scales (as in *parva)* run in three ill-defined vittæ on the prothorax, the lateral ones being slightly continued on the elytra ; they appear to be devoid of the slight coppery gloss which distinguishes the scales on *D. parva.*

Victoria ; sent by Mr. French.

EPACTICUS (gen. nov. *Erirhininarum).*

Sat elongatus ; squamis crassis vestitus ; rostrum sat gracile sat elongatum (fere ut *Gerynassæ* sed paulo brevius), arcuatum, subcylindricum ; scrobes laterales obliquæ præmedianæ ; scapus oculum attingens ; funiculus 7-articulatus ; oculi modici sat grosse granulati ; prothorax plus minusve cylin-

dricus quam elytra parum angustior, lobis oculáribus nullis; scutellum manifestum; prosternum antice fortiter emarginatum, ante coxas modice elongatum; coxæ intermediæ minus approximatæ; femora mutica; tibiæ anticæ ad apicem intus mucronatæ; tarsi robusti sat elongati, articulo 3° fortiter bilobo, 4° quam ceteri conjuncti haud multo breviori; unguiculi divaricati; segmentum ventrale 2um quam 3um 4umque conjuncta vix longius, ultimum sat breve, suturis intermediis sat rectis.

This genus is remarkable for the extreme coarseness of the scales with which it is clothed. Its structural characters are in general very similar to those of *Empira* (a genus that I do not think I have seen), but Mr. Pascoe says that the rostrum of *Empira* is exceptionally thick for an *Erirhinid*, and that its facies is of *Hypera* rather than *Erirhinus*; whereas the rostrum and facies of this genus are entirely *Erirhinus*-like, so I think there can be no doubt of the distinctness of the genera. Mr. Pascoe, moreover, does not refer to the scales of *Empira* as being coarse—a character that it would seem impossible that he could have passed over if he had had this genus before him. It may be noted that this genus bears a remarkable superficial resemblance to an uncharacterised genus, which on account of its dentate claws cannot be referred to the *Erirhininæ*, and which I hope to characterise shortly.

E. ruber, sp. nov. Rufus, abdomine (segmento apicali excepto) infuscato; squamis crassissimis subrotundatis (his albis rufescentibusque indeterminate intermixtis) vestitus; funiculi articulo basali quam sequentes 2 vix breviori; rostro (fem. ?) quam prothorax paullo longiori, punctulato; prothorace vix transverso, crebre subtilius ruguloso; elytris elongatis leviter ovatis, punctulato-striatis, interstitiis leviter convexis. Long. (rostr. incl.), $1\frac{2}{3}$ l.; lat., $\frac{1}{2}$ l. (vix).

In outline this species is much like *Erirhinus tæniatus*, F. The entire insect is clothed with whitish scales, mingled with some of a reddish tone of colour, but to a casual glance the squamosity appears altogether whitish.

S. Australia; Eyre's Peninsula.

E. nigrirostris, sp. nov. Præcedenti affinis; capite rostroque nigris (hoc longitudinaliter manifeste strigato), prothorace antennis (scapo excepto) tarsisque picescentibus; squamis elongatis vestitus. Long., $1\frac{1}{10}$ l.; lat., $\frac{1}{3}$ l.

The much smaller size and different colouring of this insect seem to distinguish it from the preceding, and the different shape of its scales, which are (not round but) elongate—resembling adpressed setæ—seems inconsistent with specific identity.

S. Australia; near Adelaide.

ENCOSMIA (gen. nov. *Erirhininarum*).

Sat elongata; dense squamosa; rostrum sat elongatum (maris quam feminæ brevius), modice robustum (fere ut *Gerynassæ*), modice arcuatum, subcylindricum; scrobes laterales sat obliquæ præmedianæ; scapus oculum attingens; funiculus 7-articulatus; clava antennarum distincte articulata; oculi sat magni grosse granulati; prothorax subcylindricus, antice modice angustatus, quam elytra paullo angustior, lobis ocularibus distinctis; scutellum distinctum; prosternum antice fortiter emarginatum, ante coxas modice elongatum; coxæ intermediæ minus approximatæ; femora mutica; tibiæ anticæ ad apicem intus mucronatæ; tarsi robusti, sat elongati, articulo 3° fortiter bilobo, 4° brevi quam 3us vix longiori; unguiculi divaricati; segmentum ventrale 2um quam 3um 4um que conjuncta paullo longius, ultimum sat breve; suturæ intermediæ ad latera vix angulatæ.

This genus has a very *Erirhinus*-like facies. Its characters are in the main much like those of the preceding genus, from which however *inter alia* its well-developed ocular lobes and short claw-joint separate it very readily. It also bears a considerable resemblance to *Emplesis*, with which, however, its mucronate front tibiæ, stouter rostrum, prosternum without any trace of excavation, shorter intermediate ventral segments, &c., will prevent its being confused. I do not find any definite character to separate it from Mr. Pascoe's *Empira* (as described), but as in the case of the preceding genus the statement that *Empira* has the facies of *Hypera* seems altogether inconsistent with possible identity, and there are several minor respects in which it does not agree satisfactorily with Mr. Pascoe's diagnosis. The structure of the antennal club is very like that of *Eniopea*, though the joints are a little more closely compacted together.

E. Adelaidæ, sp. nov. Sat elongata; ferruginea, metasterno medio et abdominis basi infuscatis; squamis sat magnis ferrugineis cinereis umbrinisque intermixtis vestita; rostro punctulato, vix distincte strigato; funiculi articulis basalibus 2 sat elongatis (basali quam 2us paullo longiori), ceteris sat brevibus; prothorace leviter transverso, antice paullo angustato, supra crebre subtilius ruguloso, lateribus leviter arcuatis; elytris punctulato-sulcatis, interstitiis subcostatis; corpore subtus fortiter sat crebre punctulato.

Maris rostro quam prothorax vix, feminæ sat manifeste, longiori. Long. (rostr. incl.), $1\frac{3}{4}$ l.; lat., $\frac{3}{8}$ l.

In good specimens the sculpture is entirely buried beneath the squamosity. The arrangement of the differently-coloured scales is too confused for very accurate description; the ashy-coloured

scales, however, run on the prothorax more or less distinctly in longitudinal lines, and on the elytra form a figure more or less like a misshapen X with the apex of one of its arms on each shoulder; while the scales of darkest colour form a more or less badly-defined somewhat triangular patch on each elytron, having its apex near the middle of the suture, and its base on the lateral margin. Abraded specimens are entirely ferruginous on the upper surface.

S. Australia; Adelaide district.

E. infuscata, sp. nov. Minus elongata; ferruginea, metasterno abdomine (apice excepto) antennisque (scapo excepto) infuscatis; squamis ferrugineis albidis et umbrinis intermixtis vestita; his umbrinis in prothorace basin versus maculas 2 et in elytris plagam communem magnam (discum totum tegentibus) formantibus; cetera fere ut *E. Adelaidæ*. Long. (rostr. incl.), $1\frac{3}{5}$ l.; lat., $\frac{3}{5}$ l.

Unfortunately this species is unique in my collection, so that I cannot afford to have its scales removed, but as far as I can judge the underlying sculpture is much the same as in *E. Adelaidæ*, except that the ocular lobes are not quite so well developed. Taking the ferruginous scales as forming the ground-colour of the upper surface, the whitish scales are thinly and inconspicuously sprinkled everywhere, and the dark-brown scales form two spots at the base of the prothorax, and cover the greater part of the elytra, so that only the sides and apex are of the lighter colour.

Victoria.

ENIOPEA.

Through the courtesy of Mr. Masters, I have been able to examine some examples of *E. amœna*, Pasc. I have in my collection some specimens (from Albany) of a very closely allied species, but as they are all more or less abraded, I do not feel quite sure that they are specifically distinct from *amœna*, so I pass them by for the present, though I feel little doubt of their distinctness.

The genus presents a good deal of difficulty, because I have species before me from various parts of Australia which do not seem structurally different from the typical species, and yet recede considerably from it in facies. I decide to assign them to *Eniopea*, although I think it probable that if Mr. Pascoe had dealt with them he would have treated some of them as requiring new generic names. I call, then, all the species *Eniopea* (regardless of their degree of general resemblance to *E. amœna*) which present the following characters (in addition to those common to all *Erirhininæ*):—Funicle seven-jointed, scape not passing front of eye, scrobes lateral, antennal club elongate and having very

distinct joints, rostrum elongate and more or less cylindric, eyes strongly granulate, femora unarmed, front tibiæ normally mucronate, third joint of tarsi bilobed, fourth joint of tarsi well exserted and having divaricate claws, prothorax without ocular lobes, the apical ventral segment elongate (not shorter than the second segment), male with a distinct pygidium.

Mr. Pascoe says that the principal characters of *Eniopea* are the distinctly (almost loosely) articulated antennal club and the exceptional structure of the apical segment in one sex. The abdominal characters in the following species are quite as in *A. amœna ;* but the antennal club, though exceptionally elongate, and very distinctly articulate in them all, is not quite so remarkable as in the typical species.

E. posticalis, sp. nov. Oblonga ; ferruginea, squamis ferrugineis ochraceis albidisque variegata, antennis (scapo excepto) obscurioribus ; rostro quam prothorax vix longiori ; funiculi articulo basali quam 2us sat (sed minus quam duplo) longiori ; prothorace quam longiori vix latiori, ochraceo-trivittato, lateribus modice rotundatis ; elytris punctulato-striatis. Long. (rostr. incl.), $1\frac{2}{5}$ l. ; lat., $\frac{1}{2}$ l. (vix).

Differs from *E. amœna*, *inter alia*, by the slightly shorter and slightly more compactly articulated club of its antennæ, by the comparatively longer second joint of the funicle, and by the different pattern and colour of the scales on the upper surface. Taking the ferruginous scales as the ground-colour, the rostrum is seen to be sprinkled with whitish scales, and the prothorax to bear three vittæ formed of ochreous scales (the external vittæ marked with white), while the elytra are marked chiefly with whitish scales, which are scattered about the base, and form a V-shaped mark with its extremities on the shoulders, and its apex about the middle of the suture, as well as a very conspicuous transversely oval spot on the suture considerably behind the middle (in front of and behind which the ground-colour is darker than on the rest of the surface). The colours and pattern are a good deal like those of some species of *Emplesis*, but the structural characters are very different from those of that genus.

N.S. Wales ; Tamworth ; taken by Mr Lea.

E. tenebricosa, sp. nov. Oblonga ; nigra, squamis albidis nigricantibusque minus distincte variegata, pedibus ferrugineis, femoribus mediis et tarsis infuscatis ; rostro quam prothorax (maris vix, feminæ manifeste) longiori ; funiculi articulo basali quam 2us sat (sed minus quam duplo) longiori ; prothorace quam latiori fere longiori, lateribus minus rotundatis ; elytris punctulato-striatis. Long. (rostr. incl.), $1\frac{1}{2}$ l. ; lat., $\frac{1}{2}$ l.

A blackish species with pale-grey and blackish scales inter-

mixed, so as to present to a casual glance a confused appearance, with very little pattern. On careful inspection there are seen to be three feebly-defined pale vittæ on the prothorax, and an indeterminate blackish fascia behind the middle of the elytra, in which the scales are somewhat fasciculated (so as to present a tubercled appearance) near the suture on either side. There are species in several genera closely resembling this in the colour and arrangement of scales, notably *Cydmæa diversa*, Blackb. (which, however, is a much broader insect with subconical prothorax and more finely granulated eyes), and a *sp.*, which will be described in a future paper.

Victoria; sent by Mr. French.

E. sydneyensis, sp. nov. Oblonga (mari magis elongato); picea vel rufo-picea, antennis pedibusque magis rufescentibus; squamis concoloribus et nonnullis albidis vestita; rostro quam prothorax vix longiori, longitudinaliter carinis subtilibus ornato; funiculi articulo basali quam 2us sat (sed minus quam duplo) longiori; prothorace quam latiori fere longiori, albido-trivittato, lateribus minus rotundatis; elytris punctulato-striatis, in humeris albido-squamosis et fascia brevi communi postmediana (hac in sutura retrorsum producta) albido-squamosa ornatis. Long. (rostr. incl.), 1$\frac{3}{5}$ l.; lat., $\frac{3}{5}$ l. (vix).

The pattern formed by the whitish scales renders this species fairly easy to recognise. It consists of three vittæ on the prothorax, a spot on each shoulder, and a common mark on the hind one-third of the elytra resembling the letter T, but in some examples this resemblance is obscured by the lower part of the stem being dilated. In one example there are indications of a whitish spot about the middle of the suture. Differs from *E. tenebricosa* by its different and better defined markings, its shorter rostrum (especially in the female), antennæ with the scape decidedly red and more robust, &c. In the male the metasternum and basal ventral segment are longitudinally concave.

N.S. Wales; taken by Mr. Lea near Sydney.

EMPOLIS (Proc. Linn. Soc., N.S.W., vol. V., 1890, p. 342).

This genus is in many respects near to *Eniopea*, but may be distinguished from it at once by the possession of well-defined ocular lobes.

E. longipes, sp. nov. Sat elongatus; subparallelus; ferrugineus, squamis concoloribus et nonnullis albidis et pallide ochraceis intermixtis (his ad prothoracis latera et ad elytrorum apicem condensatis) vestitus; antennarum funiculi articulo 2° quam 1us haud breviori; elytris punctulato-striatis. Long. (rostr. incl.), 2 l.; lat., $\frac{3}{5}$ l. (vix.)

The ferruginous scales on the elytra are of a darker tone than elsewhere; regarding them as the ground colour the markings consist of a pale ochraceous spot on each shoulder, and a large common blotch of the same colour (with a few whitish scales intermixed) occupying the apical one-third of the elytra, but not quite reaching the lateral margins except close to the apex. The longitudinal carinæ on the rostrum are very feeble. The prothorax is very nearly as long as wide, and is very evidently constricted a little behind the front margin; its sides are somewhat strongly rounded. The rostrum of the male is scarcely (of the female considerably) longer than the prothorax. Compared with *E. angustatus*, Blackb., the prothorax is evidently more elongate and the legs are distinctly longer (especially the front pair), with the apical joint of the tarsi less strongly exserted. The colour and markings are quite different from those of *E. angustatus*.

S. Australia; Adelaide district.

E. Leai, sp. nov. Sat elongatus; minus parallelus; piceus, squamis concoloribus et nonnullis albidis et pallide ochraceis intermixtis (his ad prothoracis latera et ad elytrorum partes anticas laterales apicemque condensatis) vestitus; antennarum funiculi articulo 2° quam 1us vix breviori; elytris punctulato-striatis. Long. (rostr. incl.), $2\frac{1}{10}$ l.; lat., $\frac{7}{10}$ l.

This species resembles the preceding in its markings, but its pitchy black colour (the antennæ, rostrum, and tarsi more or less reddish) will at once distinguish it. Its prothorax is distinctly transverse (even more so than that of *E. angustatus*), and is evidently constricted behind the front margin, with its sides rounded more strongly than in either species previously described. The rostrum is in both sexes about as long as that of *E. longipes*, and is very distinctly marked with fine longitudinal carinæ. The pale-coloured scales occupy the great part of the prothorax—the middle part being of the darker colour—and on the elytra they form a large ill-defined patch on the sides of the basal portion, and cover the whole apical two-fifths of the surface. The general build of the insect is markedly less narrow and parallel than in *E. angustatus* and *longipes*.

N.S. Wales. Taken by Mr. Lea near Tamworth.

EMPLESIS.

E. majuscula, sp. nov. Fem. Ovalis; sat robusta; ferruginea rostro læte rufa; squamis ferrugineis albidisque indeterminate intermixtis vestita; funiculi articulo 2° quam 1us paullo breviori quam 3us duplo longiori, articulis nullis transversis; rostro gracili arcuato, quam prothorax triplo longiori; prothorace in partibus posterioribus 3 quadrato fortiter transverso, in parte anteriori quarta fortiter con-

stricto et valde angustato ; elytris punctulato striatis, interstitiis alternis subcostatis, callo subapicali valde distincto. Long. (rostr. excl.), $2\frac{1}{3}$ l.; lat., $1\frac{1}{10}$ l.

An insect which I believe to be the male of this species is in the collection of Mr. Lea. Its rostrum is shorter (scarcely twice as long as the prothorax) ; its front tibiæ are fringed internally in their apical half with very long whitish hairs, and its undersurface is longitudinally sulcate, the sulcus ending on the apical ventral segment in a large transversely oval impression; the scales on its head, the middle of its prothorax, and the front half of its elytra are of a dark-brown colour. The peculiar shape of the prothorax and very remarkable sculpture of the elytra are as in the type ; it is from the same locality. The prosternum is indistinctly concave in front of the coxæ.

N.S. Wales ; Gosford.

EPAMŒBUS (gen. nov. *Erirhininarum.)*

Corpus squamis setiformibus adpressis vestitum ; rostrum sat gracile, modice elongatum (maris quam feminæ brevius), sat arcuatum, subcylindricum ; scrobes laterales (maris antemedianæ, feminæ medianæ) ; scapus oculum vix attingens ; funiculus 7-articulatus ; oculi grosse granulati ; prothorax sat brevis, antice angustatus, basi bisinuata, lobis ocularibus nullis ; scutellum distinctum ; elytra quam prothorax manifeste latiora, ovalia ; prosternum antice vix emarginatum, ante coxas sat elongatum ; coxæ intermediæ inter se sat distantes; femora mutica ; tibiæ anticæ haud mucronatæ ; tarsorum articuli basales 2 breves, 3° alte bilobo, 4° quam ceteri conjuncti haud multo breviori ; unguiculi divaricati ; segmenta ventralia 3um 4um que conjuncta quam 2um vix breviora, ultimo sat brevi ; suturæ ventrales intermediæ rectæ.

E. scutellaris, sp. nov. Ovalis ; rufo-testaceus, corpore subtus antennarum clava et (nonnullorum exemplorum) prothorace infuscatis ; squamis setiformibus albidis ornatus ; rostro quam prothorax (maris vix, feminæ manifeste) longiori, supra punctulato ; antennis minus elongatis, funiculi articulo basali elongato, ceteris brevibus ; prothorace transverso, antice angustato, supra sat grosse nec rugulose punctulato, pone apicem leviter constricto, lateribus leviter arcuatis ; scutello dense albo-squamoso; elytris vix striatis seriatim punctulatis, humeris obtusis. Long. (rostr. incl.), 1 l. ; lat., $\frac{2}{5}$ l.

The whitish hair-like scales are not very conspicuous or closely set, except on the scutellum, and in some parts are much more sparse than in others, giving the appearance of ill-defined denuded

spots, of which there are several on the prothorax and on the elytra, one on each side of the suture near the front, and one wide and fascia-form about the middle.

S. Australia; Eyre's Peninsula.

GERYNASSA.

G. Andersoni, sp. nov. Minus brevis; subparallela; picea vel ferruginea, antennis pedibusque testacco-rufis (nonnullorum exemplorum femoribus infuscatis); squamis piceis et ferrugineis vel albidis variegata; funiculi articulo 2° quam 1us manifeste breviori: rostro quam prothorax (maris vix, feminæ manifeste) longiori, longitudinaliter manifeste strigato; prothorace sat fortiter transverso; elytris punctulato-striatis, interstitiis 3° 5° que interrupte leviter costatis. Long. (rostr. incl.), $1\frac{3}{5}$ l.; lat., $\frac{7}{10}$ l.

Variable in colour and markings; as far as I have observed, the rostrum of the female is always ferruginous, of the male always piceous. The club of the antennæ is scarcely at all infuscate. Taking the lighter-coloured scales (which vary from grey to ochraceous) as the ground-colour, there is generally at the base of the prothorax a large dark spot, which is continued back to cover the scutellar region, but in some examples only its lateral edges run back—forming a line on either side of the scutellum. The dark scales are variously mottled over the surface of the elytra, but usually they are conspicuous on the elevated portions of the third and fifth interstices, giving those elevations the appearance of elongate feeble black tubercles.

Its small size in combination with the comparatively short second joint of its funiculus, the ferruginous antennal club, and the very feeble elevations of the third and fifth elytral interstices distinguish this species from its previously-described congeners. I have named it after Mr. John Anderson of Port Lincoln.

S. Australia; Eyre's Peninsula.

G. picticornis, sp. nov. Sat brevis; picea vel ferruginea, antennarum scapo pedibusque rufis, antennarum funiculo clavaque piceis; squamis ochraceis nigro-piceisque variegata; funiculi articulo 2° quam 1us haud breviori; rostro (feminæ) quam prothorax multo longiori, longitudinaliter manifeste strigato; prothorace sat transverso; elytris punctulato-striatis, interstitiis 3° 5° que interrupte costatis. Long. (rostr. incl.), 2 l. (vix.); lat., $\frac{1}{5}$ l.

This is a prettily-marked species; the ochraceous scales being regarded as forming the ground-colour, the blackish markings consist of three narrow vittæ on the prothorax, which run back a short distance on the elytra, and on each elytron a triangular

blotch having its base on the lateral margin as well as some small dispersed spots; the elevated parts of the interstices also are blackish. These markings are more or less distinct on all the examples I have examined. The variegated antennæ seem to be a reliable character, the scape being testaceous red, the basal two joints of the funiculus nearly black, the rest of the funiculus piceous, the club black.

N.S.W.; taken by Mr. Lea at Glen Innes.

G. simplex, sp. nov. Minus brevis; subparallela; picea vel ferruginea, antennis (clava excepta) pedibusque (nonnullorum exemplorum femoribus infuscatis) rufo-testaceis; squamis albido-griseis subsericeis sat æqualiter minus dense vestita; funiculi articulo 2° quam 1us haud breviori; rostro quam prothorax (maris vix, feminæ paullo) longiori, longitudinaliter punctulato minus distincte strigato; prothorace modice transverso, lateribus fortiter rotundatis; elytris punctulato-striatis, interstitiis sat æqualibus. Long. (rostr. incl.), $1\frac{3}{4}$ –2 l.; lat., $\frac{7}{10}$—$\frac{4}{5}$ l.

Differs from its previously described congeners, except *G. Andersoni*, in its evidently more parallel and less short build. From *Andersoni* it differs by the longer second joint of its funiculus, its elytral interstices almost devoid of inequalities, and the very strongly rounded sides of its prothorax. In the examples that I have seen there is no pattern formed by differently coloured scales, but the whole surface is somewhat thinly clothed with whitish-grey scales having a slightly silky lustre. If, however, the insect be examined somewhat obliquely, with its head towards the observer, the basal-half of the elytra appears to be of a dark-colour and the apical-half whitish, but this appears to be due only to the way in which the light falls upon the scales.

N.S. Wales.

NIPHOBOLUS (gen. nov., *Erirhininarum*).

Corpus modice elongatum, squamosum; rostrum sat breve sat robustum (fere ut *Bagoi*), leviter arcuatum, subcylindricum; scrobes præmedianæ obliquæ infra rostrum directæ; scapus oculum vix attingens; funiculus 6-articulatus; oculi grosse granulati; prothorax modice cylindricus antice angustatus, basi vix bisinuata, lobis ocularibus nullis; scutellum minus distinctum; elytra quam prothorax sat latiora; prosternum antice leviter emarginatum, ante coxas minus elongatum; coxæ intermediæ inter se sat approximatæ; femora mutica sed subtus subangulata; tibiæ anticæ ad apicem mucronatæ; tarsorum articuli basales 2 sat breves, 3° elongato fortiter bilobo, 4° vix exserto; unguiculi elongati graciles subdivaricati; segmenta ventralia 3um 4um que conjuncta

quam 2um multo breviora, ultimo sat brevi ; suturæ ventrales intermediæ ad latera vix angulatæ.

The general resemblance of this genus to *Bagous* is most noticeable, although its structural characters do not indicate any close affinity to that genus. Its most striking peculiarity is to be found, I think, in the tarsi, which are comparatively short and wide, slightly and evenly increasing in width from the base to the apex of the third joint, this latter being deeply and widely bilobed, and almost reaching beyond the fourth joint ; the claws long and slender, like those of *Bagous*, and remarkable as being (neither truly divergent nor truly divaricate, but) separated almost as abruptly as if they were divaricate, yet with their axes not quite at right angles to a line running down the centre of the fourth joint of the tarsus. The genus also differs from *Bagous* by its six-jointed funiculus, its more coarsely granulated eyes, its prothorax without ocular lobes, its prosternum not excavated, and its shorter and stouter legs. The combination of six-jointed funiculus, claw joint scarcely exserted, and rostrum comparatively short and robust, distinguishes it, I think, from all previously described genera of *Erirhininæ*. It appears to me possible that it is identical with *Notionomus*, Er., but no description of that genus has been published ; the species (*N. australis*, Er.) on which *Notionomus* was founded I have not seen (it was unknown to M. Lacordaire), but though it is clearly from Erichson's description quite different specifically from that before me, its characters suggest the possibility of generic identity. Erichson subsequently stated that his *Notionomus* is identical with *Endalus*, in which case it is certainly not congeneric with the insect I am describing, as *Endalus*, *inter alia*, has a long slender rostrum.

N. deceptor, sp. nov. Piceus, antennis pedibusque rufescentibus, squamis albidis et nonnullis brunneis dense vestitus ; prothorace leviter transverso, pone apicem fortiter constricto crebre vix subtiliter punctulato ; elytris punctulato-striatis, interstitiis sat convexis setis brevibus seriatim instructis, humeris lateraliter subprominulis. Long. (rostr. incl.), $1\frac{2}{5}$ l.; lat., $\frac{3}{5}$ l. (vix.)

To a casual glance this species bears a remarkable resemblance to the European *Bagous lutulentus*, Gyll., though differing very widely in its structural characters. In a fresh example every part is densely clothed with slightly shining scales, so small and closely packed as to simulate some extraneous indumentum. The prevailing colour of these scales is whitish, on which some brownish scales form a large feebly-defined blotch on the prothorax, and various blotches on the elytra generally of the form of two or three obscure fasciæ placed near the front, about the middle, and near the apex.

N.S. Wales ; taken by Mr. Lea near Tamworth.

The Gastropods of the Older tertiary of Australia.

Part IV. (including Supplement to Part III.).

By Professor Ralph Tate.

[Read October 17, 1893.]

Plates VI.–X.

FAMILY CYPRÆIDÆ.

Cypræa Mulderi, *Tate.*

(Trans. Roy. Soc. S. Aust., vol. XIII., 1892, pl. ix., f. 4; without description.)

Shell depressedly globose, spire concealed; basal outline oblong; back almost circular in basal outline, polished, marked with circular contusions varying from 4 to 5 mm. in diameter. Anterior canal abruptly upturned, flanked on each side by a broadly-triangular, slightly concave, thickened extension of the base. Posterior canal short, with very wide flanges, the left one more extended than the right. Base nearly flat, much thickened; outer lip excessively inflected, rounded, its inner margin set with nearly equal and somewhat slender rounded ridges; inner lip with a broad convex area steeply sloping inwards, the anterior-third furnished with about seven ridges narrower than the intervening sulcations, the rest of the lip edentulous.

Dimensions.—Total length, 100 mm.; width, 64 mm.; height, 50 mm.; length of back, 66 mm.

Localities.—Eocene; in a well-sinking at Belmont, near Geelong, one example, collected and presented by Mr. Mulder, to whom the species is dedicated; Bellarine Peninsula (Hall and Pritchard).

Affinity.—This species comes near to *C. platypyga*, McCoy, but the back is not pyriform, the anterior canal much reflected, and the shape of the base and details of the aperture are different; otherwise it might be regarded as a senile form of that species.

Subgenus Cyprædia, *Swainson*, 1840.

Dorsal surface with revolving threads or tessellated ornament. Distinguished from *Cypræovula*, Gray, 1824, by the absence of a posterior apertural notch. One living species, *C. cancellata*, is known, and there are five in the European Eocene.

Cyprædia clathrata, *Tate.*

(Trans. Roy. Soc. S. Aust., vol. XIII., 1892, pl. ix., fig. 1; without description.)

Shell oval-pyriform; anterior canal produced and somewhat dilated at the end. The surface is ornamented by revolving slender threads, alternately large and small, which are crossed by transverse threads equal in strength to the longitudinal secondaries; the intersections of the two sets of threads produce rectangular interspaces, which are very finely reticulate-striate. There are about ten primary revolving threads in about the middle-third of the dorsal surface, equal to 8 mm. of the axial length.

Dimensions.—Length, 27 mm.; width, 18 mm.

Locality.—Eocene marls, Blanche Point, Aldinga Bay. This species resembles *C. elegans*, Defr., but the pits between the primary threads are oblong, not square; the interstitial ornament is finely reticulate; and the canal is more produced and dilated.

FAMILY SCALARIIDÆ.

Crossea semiornata, *spec. nov.* Pl. x., fig. 10.

Shell depressedly conoidal, of four whorls; the first two convex.

The penultimate whorl is quadrate in section, ornamented with an elevated rounded carina at the shoulder, a similar one mid-way to the anterior suture, and a threadlet margining each suture, which is sub-canaliculate; the whole surface crossed by stout equidistant riblets, which are approximately axial on the anterior-half of the whorls, and produce rectangular pits between the revolving cinguli, on the posterior-half the riblets are oblique. The body-whorl is convex, interrupted in the posterior-third by a slight keel continuous with the posterior cinguli of the penultimate whorl; the ornament of the penultimate is continued on to the body-whorl, but gradually fades away at about a-half turn, the rest of the surface being polished and obscurely striated coincident with the outer lip.

Dimensions.—Length and width, 2 mm. (vix).

Locality.—Eocene; Bird-rock Bluff, Spring Creek, near Geelong (two exs.).

In my synopsis of the species (living and fossil) of this genus, *C. semiornata* will belong to section 2 of "group III." from the other members of which it is distinguishable by its fenestrated ornament and smooth body-whorl.

Scalaria (Acrilla) leptalea, *spec. nov.* Pl. x., fig. 1.

Shell thin, very slender, imperforated; ordinary whorls, six, convex, slightly angulated post-medially; nuclear whorls two and

a-half, smooth and polished, the anterior one angulated posteriorly, the next is slightly inflated ending in a bulbiform tip.

The posterior spire-whorls are distantly costated, the others are ornamented with curved lamelliform costæ, separated by little wider intervals.

Base of body-whorl flatly-rounded, smooth, angulated at the periphery; the peripheral keel crenulated; aperture oval, the major diameter axial.

Dimensions.—Length, 4; breadth, ·5.

Locality.—Eocene; Bullin Merri, near Camperdown (one ex.).

The nearest ally of this new species is *S. crebrelamellata*, from which it differs by its more slender shape, less crowded lamellæ, and the absence of spiral ornament on the base as well as on the whorls; the apex is also different, and the whorls are not so flat.

FAMILY NATICIDÆ.

Genus Natica.

SYNOPSIS OF SPECIES.

Umbilicus with a funiculus, without posterior callosity (Natica, s.s.).
- Shell thin, whorls slightly tabulated, funicular expansion thinly everted. 1. *Hamiltonensis.*
- Shell solid, whorls regularly convex, funicular expansion stout. 2. *subNoæ.*

Umbilicus more or less filled with a funicular callosity confluent with the columella-border (Neverita).
- Umbilicus filled with a callosity; shell hemisphæric. 3. *gibbosa.*
- Umbilicus almost concealed by posterior callosity; shell oblong-oval. 4. *eximumbilicata.*
- Umbilicus distinctly funiculate.
  - Shell narrow-oval, spire produced.
    - Length more than 2 x width, an antesutural band. 5. *balteatella.*
    - Length less than 2 x width, no sutural band. 6. *subvarians.*
  - Shell broadly oval, spire very short; body-whorl medially depressed. 7. *varians.*
  - Shell globose-conic, whorls ventricose; spire elevated. 8. *Wintlei.*
- Umbilicus not distinctly funiculate.
  - Shell globose, spire prominent. 9. *Mooraboolensis.*
  - Shell hemisphæric, spire almost concealed. 10. *substolida.*

Umbilicus simple, open; shell globulose (NATICINA).
Surface sculptured.
Surface grooved; shell solid. 11. *arata.*
Ornament of spiral wavy threads; shell thin. 12. *limata.*
Surface smooth, or nearly so.
Suture canaliculate, umbilicus small, not margined. 13. *polita.*
Suture impressed; umbilicus wide, margined; body-whorl inflated. 14. *perspectiva.*
Suture linear; umbilicus small, not margined. 15. *Aldingensis.*
Umbilicus simple, very large; shell depressed, auriform (SIGARETOPSIS). 16. *subinfundibulum.*

1. Natica Hamiltonensis, *Tate.* Pl. x., fig. 6.

N. Wintlei, var. *Hamiltonensis*, Tenison-Woods, Proc. Lin. Soc., N.S.W., vol. III., p. 229, tab. 21, fig. 8, 1878.

Shell globulose, fragile; spire short; whorls four and a-half, of very rapid increase, smooth or faintly wrinkled around suture: apical whorl flat, the others rotund, more abruptly sloping to the posterior suture; suture linear.

Aperture broadly oval, slightly oblique, outer and basal margins acute; columella slightly arched, thin, joined to the outer lip by a thin callus; umbilicus narrow, with a not very prominent funiculus, which is defined in front by a narrow groove, but the umbilicus is broader and deep behind it.

Dimensions of a large specimen:—Length, 20; width, 19: vertical height of aperture, 15; radius of aperture, 11; width of umbilicus, 2.

Localities.—EOCENE—Muddy Creek (very common)!; Mornington!; Bird-rock Bluff (rare)!; Cheltenham!; Gellibrand River!; Fyansford!; Turritella-beds, Aldinga Cliffs and Adelaide-bore!; River Murray Cliffs! MIOCENE—Kalima, Gippsland Lakes (rare)!

Remarks.—Tenison-Woods was acquainted with only immature examples (about 4 mm. diameter) of this species, which he referred under a varietal name to his *N. Wintlei*. In the adult stage, such as I have illustrated, the differences indicated between it and *N. Wintlei* are more accentuated. *N. Hamiltonensis* is a fragile shell, with a shorter spire and more convex whorls, whilst the absence of a callus on the posterior part of the columella is a very conspicuous feature.

Among living species with which I have compared it, it makes the nearest approach to *N. Zealandica*, Q. & G., but differs by more inflated spire-whorls and slender funiculus.

2. Natica subNoæ, *spec. nov.* Pl. vi., fig. 1.

Shell solid, smooth, shining, hemisphæric; whorls four and a-half, transversely finely-lined; suture concealed.

Aperture obliquely lunate, outer lip acute; columella nearly vertical; umbilicus wide, a funiculus in the anterior-third, narrow but elevated, terminating in a moderately large oval callosity, confluent in front with the columella, but separated above by a notch, beyond which the columella spreads slightly to join the outer lip.

Shelly opercula occur in association with this species at Spring Creek, which are very similar to those of such species of *Natica* (s.s.) as *N. millepunctata*.

Dimensions.—Length, 11; breadth, 10; length of columella, 8; width of aperture, 5; width of umbilicus, 2·55.

Localities. — Eocene; Bird-rock Bluff!; Muddy Creek!; Birregurra *(Mulder)!*; Table Cape!; Camperdown!.

Affinities.—This new species has a considerable resemblance to *N. Noæ*, D'Orb., *N. hemipleres*, Cossmann, and other allied species of the Parisian Eocene. From both it differs by concealment of the suture. In shape it is more like *N. hemipleres*, but its apical whorls are flatter. From *N. Noæ* it is distinguished by narrower shape, more oblique aperture, and stouter funicular dilatation more anteriorly situated.

3. Natica gibbosa, *Hutton.* Pl. vi., fig. 4.

Reference.—Trans. N. Zealand Inst., vol. XVIII., p. 334, 1886.

"Shell large, solid, smooth, gibbous, the spire almost buried; the body-whorl gibbous posteriorly. Aperture semicircular, the columella callus very large, filling the posterior portion of the aperture, and eventually covering the whole umbilical region."

Dimensions.—Length, 39; breadth, 37; diameter and radius of aperture, 34, 16·5.

Locality not actually known, but reported "a well-sinking in the Murray Desert;" the age is doubtfully Miocene.

Professor Hutton records the species from the Pareora system of New Zealand, and one occurrence from that of Wanganui.

4. Natica vixumbilicata, *Tenison-Woods.* Pl. x., fig. 9.

Reference.—Proc. Roy. Soc., Tasmania, for 1876, p. 111 (1877).

Synonym.—*N. ovata*, Tenison-Woods, op. cit., for 1875, p. 17, 1876, *non* Hutton.

Shell pyriformly oval, solid, smooth, shining. Whorls three and a-half, suture thinly covered; spire obtuse of two and a-half, rapidly increasing, slightly convex whorls; the apical-half whorl globose, its tip immersed. Last whorl very large, interruptedly

moderately convex (being slightly less convex medially); surface marked with slightly sinuous growth-lines (passing into somewhat wrinkled threads at the suture and at the umbilical margin) and interstitial fine striæ, and by inconspicuous revolving threads and towards the suture by fine striæ. Aperture semi-lunar, oblique; outer lip thin, slightly sinuated (projecting slightly forward in an alignment with the inner edge of the callus; columellar callus narrowly and flatly spreading, filling the narrow umbilicus except a conspicuous groove leading into it from the front.

Dimensions.—Length, 19; breadth, 14; diameter of aperture, 12·5; radius of aperture, 7·5.

Locality.—Eocene; "Crassatella-beds" at Table Cape, Tasmania!

Remarks.—In 1876 Tenison-Woods recorded a not uncommon Natica in the Table Cape beds as *N. ovata*, Hutton. I fail to find any such species among the various collections examined from that locality, and conclude that the subsequently described species, *N. vix-umbilicata*, was mistaken for it. Johnston ("Geol. Tasmania," 1888), however, retains both names.

N. vix-umbilicata is very much like *N. ovata*, Hutton. Compared with specimens of the latter from the Pareora River (Hutton's figure of this species, "Pliocene Moll. of New Zealand," in Macleay Memorial Volume, 1893, tab. 7, fig. 40, very imperfectly represents the shell obtained from the lower horizon), the present species is of much smaller size, slightly narrower, of fewer whorls, apex immersed, callosity not so extensive, and by the presence of an umbilical chink.

Among recent species, it has analogy with *N. conica*, but has not the elongate spire of that shell; but more so with *N. mammilla*, from which it differs by regularly convex body-whorl, proportionately wider.

5. Natica balteatella, *spec. nov.* Pl. vi., fig. 7.

Shell solid, narrow-oval-conic; whorls five, moderately convex, suture concealed by a thin adpressed extension from anterior whorl. Surface smooth, shining; ornamented by growth-lines (which are abruptly bent and develop into wrinkles on the antesutural band), coincident striæ and distant spiral striæ; a broadish band in front of the suture is conspicuously wavy-striated spirally, the spiral striæ being interrupted by the sharply-angled growth-folds, and by coincident striæ.

Aperture oval, outer lip acute; columella emitting a funicular ridge into the umbilicus, posterior callosity moderate.

Dimensions.—Length, 18·5; width, 7·5; diameter and radius of aperture, 8·5, 6·5; width of umbilicus, 2.

Localities.—Miocene, Hallett's Cove (very rare). Older Pliocene, Dry Creek-bore (very common).

This species has much resemblance to a young *N. conica*, but by its umbilicus is more akin to *N. subvarians*: the sculptured band in front of the umbilicus is a prominent distinctive feature.

6. Natica subvarians, *spec. nov.* Pl. vi., figs. 8, 10.

I apply this name to a shell, related to *N. varians*, but not connected with it by intermediate grades, from which it is distinguished by it elongate-oval outline and produced spire. From the recent *N. conica*, it is separable by its regularly-convex whorls, more open umbilicus with distinct funiculus. Fig. 6 represents a short spired variety.

Dimensions.—Length, 24; width, 17; length of aperture, 13.

Localities. — Eocene, Cheltenham (very rare)!; Miocene, Jemmy's Point and Cunningham, Gippsland!; Hallett's Cove, and Aldinga Bay!.

7. Natica varians, *spec nov.* Pl. vi., figs. 2, 9.

Shell solid, globulose-oval to pyriform-conic; spire very short, obtuse; whorls five, of rapid increase, suture concealed; last whorl very large and ventricose, usually, at least in the Muddy Creek specimens, slightly depressed on the back. Surface smooth and shining, ornamented with growth-lines and close reticulate striæ, the spiral striæ somewhat wavy. Umbilicus of moderate size, funiculus narrow, terminating on the columella in a moderate-sized callosity: columella thick, largely and thickly spreading posteriorly and over the hinder part of the umbilicus; the posterior callosity separated from the funicular callosity by a notch.

Dimensions.—(a) fig. 3. Length, 40; width, 32; length of aperrure, 31·5; width, 17. *(b)* fig. 4. Length, 41·5; width, 36; length of aperture, 36; width, 18·5.

Actual dimensions fail to convey the variability in shape presented by this species; but I have figured two somewhat extreme forms.

Localities.—Miocene (a common fossil); Jemmy's Point and Cunningham, Gippsland!; Muddy Creek!.

Remarks.—N. varians has resemblance to *N. Powisiana*, *N. effusa*, *N. intermereta*, *N. unimaculata*, and some other *Mammæ* of the North Pacific shores; the variation in shape and length of spire would permit of attachment to several of the above, but viewed in its composite character it appears to be distinguished by the fine reticulated ornament.

8. Natica Wintlei, *Tenison-Woods.*

Proc. Roy. Soc., Tasmania for 1875, t. 1, fig. 3, 1876.

Shell shining, stout, ventricosely subglobulose, umbilicated.

Whorls five and a-half to six, suture linear; spire obtuse, elongate; whorls rounded, slightly flatted posteriorly; one and a-half apical whorls depressed. Surface with fine growth-lines and coincident striæ; faintly and distantly spirally-lined, especially on the base; spirally striate on the depressed area in front of the suture. Aperture lunately-oval slightly oblique; outer lip acute not sinuate, basal lip incrassated. Umbilicus with a funicular rib; columella, posterior to the funicle, slightly dilated and confluent with the funicular termination, otherwise the umbilicus is narrow.

Dimensions of a moderately large specimen :—Length, 25·5; breadth, 21; vertical height of aperture, 18; radius of aperture, 10; diameter of umbilicus, 3. The proportion of the height to the breadth varies between 100 to 80 and 100 to 82; but a few examples from Table Cape have the relative values 100 and 84.

Localities.—Eocene; Crassatella-beds, Table Cape (common)!; basal beds of the Bird Rock-bluff, Spring Creek (abundant and large)!.

9. Natica Mooraboolensis, *spec. nov.* Pl. vi., fig. 5.

Shell globose, solid, smooth; whorls five; apex small, pointed; penultimate whorl flatly convex in posterior two-thirds, somewhat precipitously arching to the anterior suture, which is concealed; last whorl very ventricose, slantingly flattened behind. Aperture semilunate; columella stout, largely expanded behind the umbilicus, which is of moderate width, apparently simple and shallow.

Dimensions.—Length, 28; breadth, 27·5; width of umbilicus, 5.

Locality.—Eocene subcrystalline limestone on the Moorabool-river, near Geelong (one example by Mr. G. Sweet).

This species is related to *N. substolida*, but has a more elevated spire, with the whorls flatly sloping behind. Among living shells it most nearly resembles *N. plumbea*, but is more globose, whorls flattened behind, shorter spire, and larger umbilicus.

10. Natica substolida, *spec. nov.* Pl. vi., fig. 3.

Shell solid, oval-globulose, subsphærical; spire conoid, very short, apex obtuse; whorls four narrow, thinly overlapping at the suture; body-whorl very large and convex. Surface smooth and shining, faintly lined and striated spirally, more conspicuously so on the base, crossed by slightly sigmoid incised lines and obscure threads, which at the suture give rise to a narrow wrinkled-band.

Aperture oblique, regularly semilunate; outer lip acute, slightly insinuated posteriorly; umbilicus simple; columella thick, largely expanding above the umbilicus to form a thick depressed callosity.

Dimensions.—Length, 23 ; breadth, 21 ; diameter of aperture, 19 ; radius of aperture, 12.

Localities.—Eocene : A common shell at Muddy Creek and River Murray Cliffs ! ; Cheltenham ! ; Camperdown ! . Miocene : Kalima, Gippsland Lakes ! (rare and small).

Remarks.—This species is closely allied to *N. repanda*, Desh., but is distinguished by more convex body-whorl, more oblique aperture, and more obtuse and smaller spire. *N. substolida* connects the section *Naticina*, through *N. subinfundibulum*, with *Sigaretopsis*.

The specimens from the Murray-river Cliffs are smaller and have the umbilicus more concealed by the columella-callosity than those from Muddy Creek.

11. Natica arata, *spec. nov.* Pl. x., fig. 8.

Shell solid, globulose, subsphærical ; spire excessively short, apex obtuse ; whorls four and a-half, separated by a linear impressed suture ; apical whorls two and a-half, smooth, flatly convex ; the succeeding half turn with about twelve equi-distant transverse sulcations producing a crenulate margin at the posterior suture ; the surface of the remainder of the whorls linear-sulcate spirally ; at first the interspaces are slightly elevated, about equal in width to the sulci and slightly granulated by radial threads ; finally, on the body-whorl the interspaces are flat and broad, about 1 mm. wide on the medial part, and ·5 or less at the base and near the suture ; obscurely lined transversely and inconspicuously wrinkled at the suture. Aperture regularly semilunate ; outer lip bevelled to a thin edge ; columella straight, nearly vertical, rather thick, callously thinly expanding beyond the umbilicus to join with the outer lip ; umbilicus wide, deep, and simple.

Dimensions.—Length and width, 18 ; diameter and radius of aperture, 15 and 9·5 ; width of umbilicus, 3.

Locality.—Eocene calciferous sandstone, River Murray Cliffs (rare) ! ; Muddy Creek (one ex. !);

12. Natica limata, *spec. nov.* Pl. x., fig. 4.

Shell thin, fragile, globose ; spire short, broadly conic, obtuse ; apical whorls two and a-half, shining, smooth, depressedly convex ; the other whorls (two and a-half) regularly and moderately convex, of moderate increase, separated by a narrow, deeply-impressed suture.

Ornament of crowded, raised, wavy threads, sometimes linear at other times several times broader and flat, interrupted by transverse incised lines and striæ ; wrinkled at the suture, but only prominently so on the early spire-whorls.

Aperture regularly semilunate, nearly erect; outer lip thin; columella-margin thin, thinly and freely everted posteriorly, joined by a callous film to the outer lip. Umbilicus wide, simple, the ornament of the body-whorl entering the cavity.

Dimensions.—Length, 18·5; width, 18; diameter and radius of aperture, 14 and 9; width of umbilicus, 3.

Localities.—Eocene: Muddy Creek (rare)!; River Murray Cliffs (very rare)!; Mornington!; and Spring Creek (very rare)!.

13. Natica polita, *Tenison-Woods.*

Proc. Roy. Soc. Tasm., for 1875, p. 23, t. 1, f. 4 (1846) (fig. not good).

Shell shining, moderately stout, ventricosely sub-globulose, umbilicated. Whorls four and a-half, separated usually by a profundly canaliculate suture. Aperture semilunate, slightly oblique; outer lip obtuse, not at all arched. Surface smooth or transversely finely striate, and faintly spirally lined.

Dimensions.—The shell varies in the height of the spire, and much in size; an averaged sized specimen measures, long. 8·75, lat. 7·5 to 7·25, umbilicus 1. Some extremely low-spired forms, with which is invariably associated an ill-defined channelled suture and wider umbilicus (about 2 mm.), give the following measures: —long. 8·5, lat. 9·5 (River Murray); 13·5 by 13·5 (Table Cape); this variety which I will name *inflata* approaches in shape to *N. Hamiltonensis.*

Localities.—*Forma typica*, Eocene: Table Cape!; Muddy Creek, also as derived in the upper beds (Miocene)!; Mornington!; Cheltenham!; Gellibrand River!; Belmont!; River Murray Cliffs!; Shelford!. Miocene: Jemmy's Point (a single dwarf ex.!), *Forma inflata;* Table Cape!; River Murray Cliffs!; Fyansford!; Bird-rock Bluff (chiefly intermediate between *forma typica* and *var. inflata*)!; Bellarine Peninsula!.

Remarks.—Tenison-Woods (Proc. Roy. Soc. Tasm. for 1877, p. 32, 1878) records *N. polita*, also, as a recent shell on the Tasmanian Coast. Johnston (id. for 1884, p. 221, 1885) adduces the following distinctions for the separation of the living analogue under the name of *N. Beddomei*:—

"In the living form the spire is more depressed, and the whorls increase more rapidly in size. In the fossil form the nucleus is invariably smaller than in the living representative, and the number of whorls in mature specimens is four and a-half. In the living mature form the number of whorls is invariably three and a-half. The aperture in both does not present any marked difference, if we except the fact that, in the fossil state, the inner margin is almost vertical. In the living form, the same feature is more decidedly angled relative to a

central line drawn through the nucleus. If anything the fossil shell is larger and more solid, although it must be stated, that, if an immature fossil shell be selected for comparison with only the same number of whorls developed as in the mature living form, the latter seems to be the broader of the two."

14. Natica perspectiva, *spec. nov.* Pl. x., fig. 7.

Shell thin, globular, spire short, conic, somewhat obtuse; whorls four and a-half, narrow, ventricose, slightly depressed in front of the suture; suture linear impressed. Surface smooth, shining, ornamented with striæ of growth; obsoletely wavy-striated spirally, more conspicuous on base of body-whorl. Aperture regularly semilunate, erect; outer lip thin; columella-margin thin, thinly and freely everted posteriorly, joined by a callous film to the outer lip. Umbilicus broad, profund, simple, defined by an obtuse keel confluent with the basal angle of the aperture which is there thickened; the columella-wall of the umbilicus is somewhat concave, vertically and transversely lined.

Dimensions.—Length, 17; width, 16·5; base and radius of aperture, 12·5 and 8; width on umbilicus, 4.

Localities.—Eocene: Muddy Creek (common)!; Mornington!; Gellibrand River!; Camperdown!; Cheltenham!. Miocene: Gippsland (one ex.!).

Affinities.—*N. perspectiva* is related to *N. limata*, but it has more convex whorls, body-whorl much larger, larger umbilicus defined by a keel; from *N. polita* it is separable by its globose form, narrow suture, and wide umbilicus. Among exotic species it has a near ally in *N. semilunata*, Lea, of the Alabama-Eocene from which it differs chiefly in its impressed suture.

15. Natica Aldingensis, *spec. nov.* Pl. x., fig. 5.

Shell moderately solid, somewhat intermediate in shape between *N. limata* and *N. perspectiva*, but with a shorter spire, and though the suture is open yet it is not distinctly channelled as in those species; the umbilicus is like that of *limata*, but is much narrower.

Surface ornamented with striæ and lines of growth, the latter raised into slight wrinkles at the suture, and obsolete spiral lines and striæ.

From *N. semilunata* it is distinguished by its more ventricose spire-whorls and small umbilicus.

Dimensions.—Length, 19; width, 18; diameter and radius of aperture 19 and 9·5; width of umbilicus, 2·5.

Localities.—Eocene: Aldinga Cliffs (common); and Adelaide-bore.

16. Natica subinfundibulum, *spec. nov.* Pl. x., fig. 11 ; pl. vi., fig. 6.

Shell usually rather thin, depressed, auriform ; spire very short, obtuse ; whorls three, suture concealed. Surface with crowded, curved, transverse lines, which coalesce at the suture in slight folds. Spiral lines distant and faint, two or three less indistinct at the suture. Aperture obliquely lunate, outer and basal margins acute ; columella nearly vertical, the posterior-half somewhat thickened, slightly reflected, and joined to the outer lip. Umbilicus very large and perspective ; columella-wall of the umbilicus slightly concave, or with an ill-defined medial ridge, distantly spirally-lined and axially closely striate. The edge of the umbilical depression either slopes gradually inwards or is abruptly defined.

Dimensions.—Length and width, 13 ; height, 8 ; basal length of aperture, 12 ; width of umbilicus, 4·5.

Localities.—Eocene : Muddy Creek !; Mornington ! Gellibrand River ! ; Fyansford ! ; Cheltenham ! : Murray-river Cliffs !. Miocene : Muddy Creek ! ; Gippsland !.

Affinities.—This third species of the section *Sigaretopsis*, established by Cossmann (Soc. Roy. Malac. Belgique, vol. XXIII., p. 168, 1888) differs, by comparison of actual specimens, from *N. infundibulum*, Wat., by narrower and more convex body-whorl, and by more obtuse spire. Deshayes' figures of *N. Woodi* represent a more globulose shell, with a much-less open umbilicus.

I would place in this section *Natica umbilicata*, Quoy and Gaimard, recent on the coast of Southern Australia, which is referred to *Mamilla* by Tryon. Our fossil species is more compressed and vaulted, and has a much wider umbilicus.

Varieties.—Var. crassa is distinguished simply by its thick test and usually larger size, attaining to 20 mm. in length and width. It occurs at Muddy Creek in the lower and upper beds ; sometimes as a derived fossil, though rarely *in situ*, in the latter ; also at Cheltenham, where the largest specimens occur. Var. rhysa, in which the spiral ornament consists of close-set wavy threads. A single example from the River Murray Cliffs. But some specimens of *var. crassa* from Muddy Creek exhibit this ornamentation in a less conspicuous way, graduating to the typical form in which it is obsolete.

Genus Ampullina.

Section Euspira.

Ampullina effusa, *spec. nov.* Pl. x., figs. 2, 2*a*.

Shell acuminately globose, elongate ; test thin and fragile ; whorls eight and a-half, convex, slightly flattened in front of suture ; suture simple, linearly impressed ; spire elongate,

regularly conical, whorls of slow increase, apex erect with the tip immersed. Surface ornamented by crowded spiral striæ, broken up into narrow (·5–·75 mm.) transverse bands by slightly curved incised lines.

Last whorl globulose, large, a little higher than the length of the spire. Aperture somewhat oblique, semilunate; outer and basal margins effusively dilated; outer lip slightly ascending, thin; columella thinly everted; umbilicus simple, rather narrow, partly concealed by the everted columella border.

Dimensions.—Length, 35; width, 24; height of aperture, 21; width of aperture, 13, width of umbilicus, 2 *(vix)*.

Locality.—Eocene: Glauconitic clayey sands, Adelaide-bore (many examples).

Remarks.—This interesting species is certainly congeneric with *Natica acuminata*, Lamk., and *N. Levesquei*, D'Orb., transferred by Cossmann to the section *Euspira* of the genus *Ampullina*. It agrees with them in the elevated and canaliculate spire, but is readily distinguished by its regular spire (not subulate), effusively dilated aperture, and elegant sculpture; from *A. acuminata*, it is further removed by being umbilicated, but resembles *A. Levesquei* in its simple umbilicus.

Genus Sigaretus.

Sigaretus microstira, *spec. nov.* Pl. vii., fig. 10.

Shell depressed, narrow oblong-oval; spire short, not at all prominent; suture concealed; columella slightly thickened and narrowly reflected, forming an open umbilical fissure. The ornamentation consists of conspicuous undulations and coincident striæ, and of very slender and distant spiral threads and coincident striæ; the spiral ornament is hardly visible by the unaided eye, and is confined to the median and posterior portions of the body-whorl; the spiral threads are closer together (the interspaces only two or three times wider) and are more prominent posteriorly, which are there conspicuously reticulated by the transverse striæ.

Dimensions.—Length, 18; breadth, 13; height, 7.

Locality.—Eocene: Bird-rock Bluff (two examples).

Affinities.—This new species has a resemblance in outline and elevation of spire to *S. Cuvierianus*, Recluz. The umbilical fissure is open, not covered by a reflection of the columella, as is usual among living congeners, in this particular *S. microstira* is related to *C. clathratus* and some other species in the Eocene of Europe, from all of which it differs by its depressed and elongate shape.

Heligmope, *gen. nov.*

Etymology—*heligmos*, a sinuosity; *ope*, an aperture.

Shell oval-globulose, thin, not pearly, imperforate; aperture large, oblique; columella thin, truncated anteriorly; basal margin of aperture *insinuated*.

The genus may be described as an imperforate *Eunaticina*, or a *Sigaretus*, with a sinuated front margin, and stands in relation to it as *Protoma* does to *Turritella*. The non-perlaceous test removes it from the neighbourhood of *Stomatella*.

Heligmope Dennanti, *spec. nov.* Pl. vii., figs. 5-5*a*.

Shell rather thin, oval, convex [or somewhat depressed-orbicular]; spire moderately prominent [or depressed]. Whorls four and a-half, suture more or less concealed by the adpressed reflection from the anterior whorl. Ornament of slightly elevated, rounded, spiral ribs, about ten on body-whorl [sometimes the spiral ribs are almost obsolete], narrower than the flatly concave furrows, crossed by close-set lamelliform striæ, which become wider apart and more distinctly lamellar with the decreasing revolution of the spire.

Aperture oblique, oblong-oval [or semicircular]; outer lip acute, crenulated by the spiral ribs; columella cylindric, thinly reflected posteriorly and adherent over the umbilical area; the lamellæ of the back intersect the sinus-band.

The words included in parentheses in the foregoing diagnosis refer to the majority of the specimens obtained from Hallett's Cove, and thus markedly differ from the figured specimens which I select as types and with which all the Muddy Creek specimens agree; though from the former locality I have a fairly typical specimen, otherwise I should have been disposed to regard the depressed form as a distinct species.

Dimensions.—Length, 32; width, 27·5; height and width of aperture, 25 and 16.

Localities.—Miocene: Muddy Creek, Victoria, and Hallett's Cove, St. Vincent Gulf

This species was first brought to my notice by Mr. J. Dennant, who kindly forwarded me the figured examples, after whom it is named.

FAMILY HIPPONYCIDÆ.

Genus Hipponyx.

Hipponyx antiquatus, *Lin.*

H. foliacea, Quoy and Gaimard, Voy. Astrolabe, vol. III., p. 439, pl. 72, figs. 41-45.

A *Capulus*-like shell with concentric laminations and radial threads.

Habitat.—Eocene and Miocene: Muddy Creek! Recent: Australia, Polynesia, &c.

Hipponyx australis, *Lamarck.*

H. australis, Quoy and Gaimard, op. cit., p. 434, pl. 72, figs. 25-34.

Differs from *H. antiquatus* by its broadish flat radiating ribs ribs separated by narrow interstices.

Habitat.—Miocene: Hallett's Cove, St. Vincent Gulf!; and Muddy Creek! Newer Pliocene: Limestone Creek, Dartmoor *(J. Dennant.')*. Recent: Australia, New Zealand, &c.

FAMILY CALYPTRÆIDÆ.

Genus Crepidula.

SYNOPSIS OF SPECIES.

Apex terminal.	1. *unguiformis.*
Apex submarginal.	2. *dubitabilis.*
Apex posterior, but distant, hooked.	3. *Hainsworthi.*

1. Crepidula unguiformis, *Lamarck.*

Id., Reeve, Conch. Icon., fig. 1.

Forma typica.—Upper surface flat or concave.

Habitat.—Miocene, Gippsland!. Fossil specimens have been compared with living examples from east coast of N. America and from Southern Australia. [Also Pliocene, Wanganui, &c., New Zealand. Recent, almost cosmopolitan.]

Forma convexa.—(Syn. *C. immersa*, Angas). Upper surface convex.

Habitat.—Eocene: Muddy Creek!; Cheltenham!; Table Cape!. Recent: South Australia, &c.

Forma inflata.—(Syn. *C. monoxyla*, Lesson). Upper surface very convex; resembles *C. fornicata* without radial ridges.

Habitat.—Eocene: Muddy Creek!. Miocene: Muddy Creek (specimens faintly ridged)!. Newer Pliocene: Limestone Creek *(J. Dennant.')*. Recent: New Zealand, and also in Pliocene strata at Wanganui, Petane, &c.

2. Crepidula dubitabilis, *spec. nov.* Pl. ix., fig. 5.

Shell like *C. monoxyla*, but the small spiral apex is narrowly separated from the margin. It, however, varies from convexedly depressed to moderately inflated.

Dimensions of a medium specimen:—Length, 25; width, 16; height, 8.

Localities.—Eocene: River Murray Cliffs!; Mornington!. Miocene: Gippsland lakes!

3. Crepidula Hainsworthi, *Johnston.*

Ref.—Proc. Roy. Soc. Tasmania for 1884, p. 333, figs. *a-c*, 1885; *id.*, Geol. Tasmania, t. 32, f. 13, 1888.

Basal outline oval, narrowly and abruptly arched laterally,

and gently rounded longitudinally; surface with fine growth-lines; beak hooked, posterior, projecting beyond the posterior margin.

Dimensions.—Length, 14; breadth, 8; height, 5·5 mm.

Locality.—Eocene: Table Cape *(J. M. Johnston).*

Genus Calytraea.

synopsis of species.

Axis imperforate (Calyptraea, *s.s.*).

Shell depressed, apex subcentral.

Concentrically corrugated, interruptedly convex. 1. *corrugata.*

Concentrically lamellose-striate, regularly convex. 2. *placuna.*

Spire elevated, apex lateral or subcentral.

Whorls ventricose, posteriorly flattened. 3. *subtabulata.*

Whorls regularly convex.

Spire narrow-conic; finely lamellate-striate concentrically; spirally-lined. 4. *undulata.*

Spire broad-conic; concentrically lamellose. 5. *crassa.*

Axis umbilicate (Calyptropsis) depressedly convex, apex very excentric.

Body-whorl ventricose; base subcircular.

Concentrically lined, radially lined and striated. 6. *arachnoideus.*

Body-whorl flatly sloping posteriorly.

Base subcircular, slender radial and concentric threads. 7. *turbinata.*

Base oval, radially costated, finely lamellose, striated concentrically, body-whorl much depressed. 8. *umbilicata.*

1. Calyptraea corrugata, *spec. nov.* Pl. vii., fig. 9.

Shell depressed, orbicular in basal outline, sub-pellucid; body-whorl more or less ventricose around the suture, surface irregularly concentrically ridged; edge of septum slightly arched.

Similar to *C. pellucida*, Reeve, with specimens of which I have compared it; but differs by interruptedly-convex whorls and strong growth-folds.

Dimensions.—Basal diameters, 12 and 11: height, 3·5.

Localities.—Miocene: Muddy Creek and at Nor'-west Bend, River Murray.

2. Calyptraea placuna, *spec. nov.* Pl. vii., fig. 4.

Shell depressed, thin, fragile, orbicular in basal outline; body-whorl regularly convex, anterior surface slenderly lamellate concentrically, becoming posteriorly striate.

Dimensions.—Basal diameters, 15 and 16 ; height, 4·25.
Localities.—Eocene : Aldinga Cliffs and Adelaide-bore.

3. Calyptraea subtabulata, *spec. nov.* Pl. vii., fig. 1.

Syn.—*Trochita calyptraeformis*, R. M. Johnston, Proc. Roy. Soc., Tasmania for 1876, p. 86 (1877) ; id., "Geol. Tasm.," t. 29, f. 14.

Shell moderately stout, orbicular in basal outline, spire elevated, subcentral ; apex minute, slightly exsert ; body-whorl conspicuously flattened in front of suture, surface with subimbricating growth-folds and spiral coarse striæ : septum with a nearly straight edge.

The shell varies much in height, and the higher the spire the more tabulated are the whorls, the figured specimen represents the most commonly-occurring form.

Dimensions.—Basal diameters, 29·5 and 26·5 ; height, 12.

Locality.—Eocene : Table Cape, Tasmania, *R. M. Johnston, &c.* !

This abundant fossil at Table Cape was referred by Johnston to the living Australian shell, *Trochus calyptraeformis*, Lamarck (=*Calyptraea tomentosa*, Quoy and G.), to which, however, it has only a distant resemblance.

Pileopsis navicelloides, R. M. Johnston, Poc. Roy. Soc., Tasmania, for 1879, p. 39 (1880), is probably a *Calyptraea*, and possibly a very young state of *C. subtabulata*. The original diagnosis reads as follows :—Shell minute, depressed, subrotund ; nucleus scarcely lax, exserted, of about one and a half smooth turns, submarginal ; disk with rough uneven surface, concentrically irregularly striate ; aperture ovate, closed at posterior margin by a *spiral concave* shelf, terminating on either side by a downward reflexed curve in the muscular impressions, which are well-defined. Dia. mag., 3·5 ; min., 3 ; alt., 1. Table Cape (one specimen).

4. Calyptraea undulata, *spec. nov.* Pl. vii., fig. 3.

Shell thin, orbicular in basal outline ; spire elevated, subcentral, of rather rapidly increasing, steep-sloping whorls ; apex minute, oblique, circinately-coiled ; body-whorl regularly convex ; surface concentrically ridged and coincidently striated, faintly spirally-lined ; septum with a nearly straight edge.

Dimensions.—Major and minor diameters, 16·5 and 15·5 ; height, 8.

Localities.—Eocene : Muddy Creek ; River Murray Cliffs.

Differs from *C. subtabulata* by regular convex whorls and more excentric spire.

5. Calyptraea crassa, *spec. nov.* Pl. vii., figs. 2, 7.

Shell rather stout, orbicular in basal outline ; spire elevated, subcentral of rapidly increasing, moderately convex whorls ;

apex small, oblique, circinately coiled; body-whorl regularly flatly convex, concentrically lamellose-ridged; septum with a concave edge.

Dimensions.—Diameters, 27 and 25; height, 11.

Localities.—Miocene: Gippsland Lakes (common)!; Hallett's Cove!.

Differs from *C. undulata*, by its less excentric apex and less ventricose whorls.

Subgenus Calyptropis, *Tate.*

Ref.—Proc. Roy. Soc., N.S. Wales, vol. XXVII., p. 181, 1893.

"Shell like *Calptraea*, but umbilicated, and with a columella-insinuosity at the umbilical border.

6. Calyptropsis arachnoideus, *spec. nov.* Pl. vii., fig. 9.

Shell thin, orbicular in basal outline; spire depressed, apex submarginal, of rapidly increasing, ventricose whorls; surface ornamented with acute raised concentric threads and distant similar spiral threads; the interspaces with close, raised striæ; septum slightly ecurved medially, slightly concave, faintly radiately ridged.

Dimensions.—Diameters, 12·5 and 10·5; height, 4·25.

Localities.—Eocene: Aldinga Cliffs and Adelaide-bore (very rare.

7. Calyptropsis turbinata, *Ten.-Woods.*

Trochita turbinata, Ten.-Woods, Proc. Lin. Soc., N.S. Wales, vol. III., p. 238, pl. 21, fig. 1, 1879.

Shell thin, suborbicular in basal outline, turbinately depressed; whorls two and a-half, rapidly increasing, somewhat flattened posteriorly, apex exsert; surface slightly corrugated concentrically, and coincidently finely lined; spirally distantly lined, faintly ridged on posterior area of body-whorl; septum deeply sunk, radiately sulcate; umbilicus narrow.

Dimensions.—Diameters, 11 and 10; height, 4·5.

Localities.—Eocene: Muddy Creek *(Tenison-Woods!)*; Bird-rock Bluff, near Geelong!.

8. Calyptropsis umbilicata, *Johnston.*

Crepidula umbilicata, R. M. Johnston, Proc. Roy. Soc. Tasmania for 1884, p. 232 (two figs.), 1885; id., "Geol. Tasmania, t. 32, fig. 10, 1888.

Shell rather thin, oval in basal outline; body-whorl depressed, flatly convex, more rapidly sloping from the periphery to the margins; apex posterior, oblique, submarginal, slightly elevated; whorls two and a-half of very rapid increase; surface somewhat rugose with a few distant spiral ridges crossed by lamellæ of

growth, and coincident fine striæ. Septum flat or slightly concave, its margin nearly straight; umbilicus moderately wide profund.

Dimensions.—Diameters, 17 and 13; height, 5.

Locality.—Table Cape *(R. M. Johnston !)*.

Genus Capulus.

Syn.—*Pileopsis*, Lamk.

SPECIES EXCLUDED.

Pileopsis naricelloides, Johnston, is transferred to *Calyptraea*.

1. Capulus circinatus, *spec. nov.* Pl. vii., fig. 8.

Shell cornucopia-shaped with a spiral recurved slightly excentric apex, base roundly oval, sides slightly compressed; whorls two and a-half, the anterior one detached; surface with fine radial threads crossed by slender folds and fine threads which are arched medially.

Dimensions.—Diameters, 2·5 and 2; height, 3·25.

Locality.—Eocene: Adelaide-bore (one ex.).

2. Capulus Danieli, *Crosse.*

Syn.—*C subrufus*, Sowerby, *non* Lamk.

The fossils, which I refer to the living species of this name, have been compared with specimens of a species usually known in Southern Australian waters as *Capulus subrufus*, Sowb., the larger forms of which have received Crosse's name, as the result of comparison of authenticated examples from New Caledonia.

Tyron places the species in the genus *Hipponyx*, but as no shelly base is formed, I retain it in *Capulus*.

The shell has somewhat compressed sides, an irregular orbicular base, but it is variable in these particulars, as largely dependent on the outline of the surface of attachment; the apex is posterior usually turned to the left, and either prolonged or subspirally hooked.

The fossil specimens exhibit equal variation of shape and form of apex, as do the recent ones, but seem to be devoid of fine radial ridges, and thus present the usual aspect of beach-shells.

Localities.—Eocene: Muddy Creek !. Miocene: Aldinga Cliffs and Muddy Creek !.

FAMILY TURRITELLIDÆ.

Genus Turritella.

From the great variability in form and sculpture of the majority of our fossil-species of this genus, one is tempted to conclude that no satisfactory position can be taken up anywhere

between the extremes regarding the whole genus as an enormous protean species, or describing nearly every colony as a separate species. Here characters can be seen varying in all directions, and in almost all degrees, though some variations seem to be fixed, whilst others remain indefinite. This is very perplexing in the definition of species, though to the student of evolution this difficulty will be full of interest.

Specimens presenting a sinus in the outer lip are too rare (and so far only observed in two species) to use this feature in the arrangement of the species, but the form of curvature, which the incremental lines present, may prove of importance; the exigencies of publication have, however, prevented me testing fully the classificatory value of this character.

The internal septation, which is exhibited by two of our species (*T. septifraga*, in which it is invariable and frequent, and *T. tristira*, observed in one instance), is a feature hitherto unrecorded in the genus.

SYNOPSIS OF SPECIES.

Whorls smooth, or not distinctly lirate, subimbricating.
  Shell very elongate, posterior whorls medially carinate. 1. *septifraga.*
  Shell under 15 mm., anterior whorls ridged posteriorly. 2. *pagodula.*
Whorls carinate and lirate.
  Keels granulose.
    Keels three, median granulose. 3. *Aldingae.*
    Keels three, anterior and median granulose. 4. *Warburtoni.*
    Keels three, middle one granulose. 5. *Sturtii.*
    Keels four to five, all granulose. 6. *gemmulata.*
  Keels not granulose.
    Keels three, equal. 7. *tristira.*
    Keel one, very prominent. 8. *conspicabilis.*
    Keels two, whorls imbricate. 9. *acricula.*
Whorls lirate.
  Liræ numerous, squamose, whorls medially concave. 10. *Murrayana.*
  Liræ under 20, more or less unequal, whorls flat or imbricate; shell slender. 9. *acricula.*
  Liræ five or less, whorls flat or slightly convex. 11. *platyspira.*

SPECIES EXCLUDED.

Turritella transenna, Tenison-Woods, Proc. Lin. Soc., vol. III., p. 234, an Eocene-fossil at Muddy Creek, is transferred to *Mathilda*.

1. Turritella septifraga, *spec. nov.* Pl. viii., fig. 5.

Shell narrowly lanceolate-turreted ; whorls 18, apex unknown anterior whorls concave, sloping to the sharp angulation at (and somewhat imbricating over) the anterior suture ; posterior whorls flat or very slightly concave, slightly keeled in the anterior-fourth, suture linear.

Surface ornamented with deeply sinuous, crowded, fine striæ of growth ; the anterior keel of the anterior whorls two to three lined, faintly and distantly lined on the concave area.

Aperture subquadrangular, outer lip with a broad, moderately-deep sinus (that is judging from growth-lines).

The interior is septated at every two or three whorls throughout the posterior-half of the length of the shell; and the facility with which the shell breaks at these junctions has suggested the specific name.

Dimensions.—Length (incomplete), 100 ; width, 17.

Locality.—Eocene : Bird-rock Bluff, Geelong ! .

The absence of conspicuous spiral ornament removes this species from somewhat similar congeners, such as *T. Cumingii*, Reeve, *T. imbricataria*, Lk., &c.

2. Turritella pagodula, *spec. nov.* Pl. viii., fig. 10.

Shell small, acuminately turreted ; whorls thirteen (incl. embryo), with a prominent roundly-angled ridge over the anterior suture, with or without a less conspicuous ridge at the posterior suture; apical whorls two, very small, inflated ; posterior spire-whorls keeled over the suture. Surface smooth, shining, closely insinuate-striate transversely and faintly spirally-lined in the concave area between the anterior and posterior ridges. Periphery of body-whorl subtended by a subordinate keel ; base with about ten concentric threads crossed by radial striæ. Aperture subquadrangular ; outer lip with a semicircular insinuation above the anterior keel.

Dimensions.—Length, 12·5 ; width, 4·25.

Locality.—Miocene : Gippsland Lakes (not uncommon !).

This species has some affinity with the recent *T. exoleta*, Linn., but its small size and obsolete posterior ridge distinguish it; also with *T. granulifera*, Tenison-Woods, which is, however, conspicuously different by its granulated keels ; and more so with *T. terebellata*, Tate, *m.s.*, Newer Pliocene, Limestone Creek, W. Victoria, which has the anterior keel nodulose.

3. Turritella Aldingæ, *Tate.* Pl. viii., fig. 1.

Reference.—Trans. Roy. Soc. S. Aust., vol. V., p. 45, 1882.

Shell acutely pryamidal, a little more than three times as long as broad, whorls about twenty in a length of 33 mm., sub-

quadrate or flattish with three prominent ribs, moderately impressed suture, the medial ones usually granulose. Base flattened, ornamented with many unequal-sized spiral threads, which are crossed by very fine radial striæ. Aperture subquadrate, margins united by a somewhat thick callus, which extends over much of the base; columella arched, regularly curving to the rounded basal lip; outer lip somewhat flatly compressed, deeply and broadly sinuated.

The ornament on the whorls varies much in different specimens, as well as in different parts of the same shell. The medium prominent rib is generally granulose; the posterior rib is bisulcated, or not infrequently replaced by two or three strong threads; the interspaces between the ribs and adjacent to the sutures are ornamented with a few spiral threads crossed by curved lines of growth. On the anterior whorls of large examples there are about eight unequalled-sized spiral ribs—the posterior rib on the earlier whorls has developed into three prominent ribs, and one or more of the intermediate threads have become conspicuous, whilst the granulations of the medium rib have disappeared.

The posterior six whorls or so have occasionally all the ribs granulose, thus resembling *T. Sturtii;* but at this early stage *T. Aldingæ* does not possess intermediate ribs.

Dimensions.—Length, 36; breadth, 10·5; depth and width of sinus, 3.

Localities.—Eocene: Argillaceous limestone and associated clays at Blanche Point, Aldinga Bay (very abundant), and Adelaide-bore!; also in the "Turritella limestone" about Ardrossan, Yorke Peninsula *(J. G. O. Tepper!).*

In outline, general shape of whorls, and deep sinus, this fossil species has an analogue in *T. runcinata*, Watson, "Challenger" Gasteropoda, p. 475, t. 30, fig. 3; compared with actual specimens of which, the fossil is conspicuously distinguished by curved columella (not straight in the axis, and effusively dilated at the front), and tricarinate whorls.

4. Turritella Warburtoni, *Ten.-Woods.* Pl. viii., fig. 2.

Shell small, narrowly pyramidal; whorls 15, in a length of 9·5 mm.; apex of two and a-half smooth turns, the tip subglobulose, the next turn narrow and convex; ordinary whorls concave, separated by a narrow deeply impressed suture, roundly elevated at the posterior suture, more angulated and elevated at the anterior suture; posterior to which and near to is a more acute but less stout keel; the two anterior ribs more or less granulose; each of the interspaces between the keels with two or three fine threads of varying size. Growth-lines hardly discernible, slightly

arched. Base flat, separated from peripheral keel by a deep groove; ornamented with about eight spiral ridges.

Aperture quadrate; columella thinly reflected.

Dimensions.—Length, 14; breadth, 4.

Locality.—Eocene: Table Cape (*Ten.-Woods*, common!).

Has a resemblance to *T. pagodula*, Tate, but is a narrower shell, and differs in the details of the ornamentation; from *T. granulifera*, T.-Wds., to which it bears some resemblance by its smooth posterior keel and its prominent anterior one.

5. Turritella Sturtii, *Tenison-Woods.* Pl. viii., fig. 6.

Shell small, acutely pyramidal; whorls fifteen in a length of 12 mm., apex of three small smooth rounded turns; ordinary whorls constricted at the suture, spirally ribbed; prominent ribs three, equidistant, of which the median and anterior ones are granulose, the posterior one often double, each interspace with about two fine spiral threads; growth-lines deeply arched. Base flattened, angulated at the margin, with seven or eight equal-sized spiral threads, crossed by numerous very fine striæ. Aperture subquadrate; outer-lip thin; columella thinly reflected behind and over the base.

Dimensions.—Length, 22; breadth, 5·25.

Locality.—Eocene: Abundant in the "Turritella beds," Table Cape (*Tenison-Woods.!*).

6. Turritella gemmulata, *spec. nov.* Pl. viii., fig. 11.

Shell minute, narrow lanceolate-turreted; apex of one and a-half turns, the tip globulose, the next turn convex, narrow; whorls nine (excl. embryo), flatly concave, but separated by a broad, deeply impressed suture; ornamented by beaded ribs, decreasing in number from front backwards from five or six to three, the next but one to the anterior suture usually with the largest granules; the last three spire-whorls bi- or uni-carinate. Periphery of body-whorl rounded, base with about five encircling threads; aperture rotund, columella thinly reflected.

Dimensions.—Length, 6·5; width, 1·75.

Localities.—Eocene: Muddy Creek (not uncommon!); Bird-rock Bluff, Spring Creek (rare!).

7. Turritella tristira, *Tate.* Pl. viii., fig. 8; Pl. x., fig. 3.

Ref.—Proc. Roy. Soc., Tasmania, for 1884, p. 227 (1885).

Shell acuminately turreted; apical angle about 15°; whorls seventeen, anterior and medial whorls slightly convex, suture linear; apex globulose of one and a half whorls, the tip immersed, the first four or five spire-whorls flatly convex, the next three or four medially concave. Surface ornamented with three conspicuous, acute, spiral ribs, the interspaces with closely and

finely spiral striæ and inconspicuous transverse striæ; the sulci on each side of the central rib are of equal breadth, but the anterior rib is separated from the suture by a distance less than that which intervenes between it and central rib, whilst the posterior rib is separated from its corresponding suture by a distance greater than the breadth of the medial sulcus. Last whorl with four keels, truncately angular at the periphery; base spirally flatly ribbed and interstriated. Aperture quadrate; outer lip imperfect; the striæ of growth deeply roundly arched between the anterior and posterior keels.

Dimensions.—Length, 46; breadth, 12.

Locality.—Eocene: Table Cape (*R. M. Johnston*, one example!): Cheltenham (not uncommon!); Camperdown!; Belmont!; (?) well-sinking, Murray Desert!. Miocene: Gippsland Lakes (very abundant!).

This species is distinct from the few living species, which are conspicuously three-ribbed, by shape, ornament, and the unsymmetrical position of the revolving keels. *T. tricincta*, Hutton, Pliocene and Miocene in New Zealand, has three unequal keels and the whorls more convex.

8. Turritella conspicabilis, *spec. nov.* Pl. viii., fig. 7.

Shell similar to *T. tristira*, but differs in its ornamentation. The spire is acuminately attenuated; the embryonic whorls are succeeded by two or three convex whorls, then follow three or four, which are convex posteriorly, but abruptly declining to the anterior suture: the anterior keel becomes stronger, and on the posterior area threads appear, increasing in number with the revolution of the spire. Anterior whorls have a high rounded rib, situated in the anterior one-third, separated by a wide sulcus from the posterior one-half, which is ornamented by six to ten threads alternately large and small; the anterior-half, including the keel, is spirally striate.

Locality.—Eocene: Spring Creek!. Miocene: Gippsland Lakes!.

Though associated with *T. tristira* at the latter locality, and not with it elsewhere, yet as there are no decided intermediate stages, I have somewhat reluctantly considered it a distinct species. A varietal form (pl. ix., fig. 6), if not a distinct species, occurs abundantly at Spring Creek, which differs by less prominent keel. It makes some approach to that variety of *T. runcinata*, in which the front keel is conspicuously elevated, but the whorls are more quadrate, the keel truncated on the edge; whilst the spiral striæ are fewer and not wavy-interrupted.

9. Turritella acricula, *spec. nov.* Pl. viii., fig. 4; pl. ix., figs. 4, 7, 8.

Shell very acutely lanceolate-turreted; whorls twenty, apex mammillary of two narrow convex turns, early posterior whorls

smooth and sharply carinated in the middle, anterior whorls flatly convex to the sharp or blunt angulation at (and somewhat imbricating over) the anterior suture, sometimes the anterior angulation is obsolete. Surface ornamented with spiral threads (about fifteen or more); of these three to five are sharply elevated into slender keels, the medial one of which is usually the most prominent, the interspaces being then finely lirate; rarely are the threads approximately of equal strength. The transverse ornament consists of medially-arched growth-lines, close or rather distant, in the latter case producing the appearance of punctures, sometimes the lines of growth are raised into lamellæ. Periphery of body-whorl acutely angulated, base concentrically ribbed and radially striated. Aperture subquadrangular, slightly oblique, columella nearly straight, thinly reflected and spreading behind; outer lip not seen perfect.

Dimensions.—Length, 38; breadth, 6·25

Localities.—Eocene: River Murray Cliffs (very abundant!); Sc. Mornington!; Muddy Creek!; Cheltenham!; Corio Bay!; Camperdown!; Gellibrand River!; Spring Creek!; Table Cape. Miocene: Gippsland Lakes!; Aldinga Cliffs (imperfectly determinate!).

This species varies in the form of the whorls and the development of the liræ; a variety occurring at Gellibrand River and Muddy Creek has slightly, though regularly, convex whorls, which are finely lirate (pl. ix., fig. 4); a similar form occurs at Table Cape (pl. iv., fig. 12), but is much stouter, slightly angulated towards the suture, and strongly lirate.

It is separable with difficulty from *T. acuta*, Ten.-Woods, Proc. Roy. Soc. Tasmania, p. 143, 1876, a recent species in S. Australia and Tasmania; they have similar apices, and exhibit the same variation in the extent of imbrication of the whorls; but *T. acricula* is relatively narrower, and has more liræ, whilst in *T. acuta* the liræ never assume the character of keels.

10. Turritella Murrayana, *Tate.* Pl. viii., fig. 3.

Torcula Murrayana, Tate, Proc. Roy. Soc. Tasm., for 1884, p. 227 (1885).

Shell pyramidally turreted, apical angle about 15°. Whorls twelve to fourteen, flattish, medially depressed, and acutely elevated at about the anterior-fourth; suture thread-like or somewhat grooved; apical whorls two, very small, globulose; first spire-whorls rapidly enlarging 1-3 carinate. Surface ornamented by about 24 spiral threads, with or without smaller intermediary ones, crossed by close-set striæ, the latter on the anterior whorls thinly squamose. Last whorl bluntly truncated on the periphery; base with spiral threads and transverse striæ as on the upper part of the whorl.

Aperture quadrately oval, continuous; outer lip with a deepish subtriangular median sinus.

The sectional outline of the whorls varies from flat or slightly concave to somewhat quadrate, and correspondingly in the depth of the suture; the ante-medial keel is sometimes obsolete, but the medial depression is always present.

Dimensions.—Length, 60; breadth, 17; height of last whorl, 12.

Localities.—Eocene: River Murray Cliffs (very abundant!); Muddy Creek!; Corio Bay, near Geelong!; Mornington!; Gellibrand River!; Belmont!; Table Cape *(R. M. Johnston.)*. Miocene: Gippsland Lakes (rare!).

T. Murrayana has resemblance to *T. declivis*, Ads. & Reeve, but has not the backward-slanting whorls of that species, which is apparently without a conspicuous sinus in the outer lip. It has also much resemblance to *T. rosea*, Quoy & Gaimard, but in that the spiral ornament of the posterior whorls develop into ribs on the anterior whorls.

The Table Cape specimens have usually flattish or slightly concave whorls with or without the anterior keel, but fall within the limits of variation exhibited by the Murray examples, though they are usually broader in proportion—the apical angle being as much as 18°

11. Turritella platyspira, *Tenison-Woods.* Pl. viii., fig. 9.

Ref.—Proc. Lin. Soc. N.S.W., vol. III, p. 234, t. 20, f. 13, 1878.

Shell acutely pyramidal-turreted, thin, polished; spire subulate-attenuated, ending in a nucleus of two very small rotund turns. Whorls fifteen, the posterior ones flat, the anterior ones slightly convex; ornamented by three inconspicuous (sometimes obsolete) spiral threads, which are equidistant from each other and from the sutures, the interstices faintly spirally striated; a shallow sulcus separates the anterior thread from the medial one; incremental lines deeply flexuous, hardly visible.

Aperture subquadrangular, base finely concentrically lined. Length, 13; width, 3·75.

Localities.—Eocene: Muddy Creek *(Tenison-Woods.)*; River Murray Cliffs!; Gellibrand River!; Fyansford!; Mornington!.

T. platyspira resembles *T. congelata*, Ads. & Reeve, but that shell seems to be wanting in the deep sigmoidal growth-lines.

Genus Mesalia.

Mesalia stylaeris, *spec. nov.* Pl. ix., fig. 2.

Shell minute, thin, and pyramidally turreted, with a mucronate apex; pullus cylindric of four narrow convex whorls; spire-whorls five, convex or subangulated medially, ornamented by

about seven narrow flat threads; body-whorl convex to the rounded or subangulated periphery; lirate and crossed by slightly sigmoidal incremental striæ; base flattened or subconvex; aperture oval; outer lip thin, medially ecurved; columella thick, arched, flattened, and margined at the exterior, callously united to the outer lip.

Dimensions.—Length, 4; breadth, 2 (vix.).

Locality.—Eocene: "Turritella-banks," Blanche Point, Aldinga Cliffs (common!).

This diminutive species of the genus is otherwise distinguished by its styliform apex.

FAMILY VERMETIDÆ.

Genus Thylacodes.

Shell adherent, irregularly twisted, without laminæ or keels internal, but frequently concamerated.

SYNOPSIS OF SPECIES.

Posteriorly compactly coiled, afterwards lengthened.		
Whorls embracing forming a broad cone.	1.	*actinotus.*
Whorls contiguous forming a cylinder.		
Surface lirate and finely costate.	2.	*cratericulus.*
Surface roundly costate.	3.	*conohelix.*
Posteriorly irregularly and loosely coiled.		
Uncoiled portion much extended, densely squamosely ribbed.	4.	*asper*
Uncoiled portion short; distantly ribbed.	5.	*rudis.*
Shell vermiculate, slender, finely sculptured.	6.	*Adelaidensis.*

1. Thylacodes actinotus, *spec. nov.* Pl. ix., fig. 1.

Solitary or rarely two together; whorls embracing and reciprocally adherent except the last turn, which is extended into a very short erect tube. The aggregate mass is broadly conical; ornamented with thin lamellose radial ridge; the free tubular portion circular in section.

Dimensions.—Diameters, 5 to 6; height (ex. free tube), 2·5.

Locality.—Eocene: Adelaide-bore!.

2. Thylacodes cratericulus, *spec. nov.* Pl. ix., fig. 3.

Solitary or two together, early whorls irregularly coiled, anterior whorls compacted, irregularly conoid or shortly cylindroid, finally obliquely-extended into a long much-narrowed tube. Whorls ornamented with five or six spiral ridges crossed by straight threads producing square or oblong fenestrations; basal part of tube similarly ornamented gradually becoming obsolete towards the extremity.

Dimensions.—Diameters of base, 6·5 and 5·5 ; length of tube, 8 ; its diameter, 1·5.

Localities.—Eocene : Muddy Creek ! ; Mornington ! ; Fyansford ! ; Gellibrand River !.

3. Thylacodes conohelix, *Ten.-Woods.* Pl. ix., fig. 11.

Vermetus conohelix, Tenison-Woods, Proc. Roy. Soc. Tasm. for 1876, p. 100, 1877.

Solitary, "tube adhering, corrugated, coiled ; lower whorls laterally depressed into a ridge, and coiled upon each other with a truncated flattened hollow cone of two whorls, at the apex the tube becomes free, obliquely erect, flexuous, and cylindrical ; aperture somewhat thick and orbicular. Height of cone, 3 ; breadth, 6 ; length of free end, 5 ; width of aperture, 1."

The common form of this shell at Spring Creek, which I figure, has a more contracted base, and the anterior whorls forming a cylinder.

Localities. — Table Cape *(Ten.-Woods !)* ; Spring Creek (common !) ; Moorabool Valley, and Bellarine Peninsula *(G. B. Pritchard !)*.

4. Thylacodes asper, *spec. nov.* Pl. ix., fig. 10.

Solitary, early whorls more or less regularly convolute ; finally horizontally extended, at first attached, but largely free. Free tube with crowded, slightly elevated longitudinal ribs, narrower than the sulci, crossed by intricately-disposed lamellar threads, which produce asperities on the ribs.

Dimensions.—Diameter of the close spiral, 6 ; of free tube, 3·5.

Locality.—Eocene: Gellibrand River !.

5. Thylacodes rudis, *spec. nov.* Pl. ix., fig. 8.

Usually solitary ; base contortedly coiled, broadly and laterally attached ; anterior whorls rounded, more loosely coiled and irregularly bent, free part of tube short, not contracted, circular in section. The early whorls are concamerated. Surface ornamented with longitudinal liræ, about eleven on upper and lateral areas, distantly squamosely elevated.

Dimensions.—Diameter of aggregate mass, about 25; diameter of tube, 5·5 to 6.

Locality.—Eocene : Table Cape !, Gellibrand River !.

This species is the fossil analogue of *Vermetus arenarius*, Quoy and Gaimard, from which it differs by less-compactly-coiled and abruptly-bent whorls, and fewness of longitudinal liræ.

6. Thylacodes Adelaidensis, *spec. nov.* Pl. ix., fig. 9.

Solitary. Attached portion not known. Free part filiform, irregularly bent, circular in section ; surface ornamented with

slender, obtuse threads, about 25 at the widest part (sometimes obsolete), minutely squamosely elevated at the intercrossing of regular circumscribing striæ.

Dimensions.—Known only by fragments, the greatest diameter of which is 2·5; diameter at the only partition observed, 1.

Localities.—Eocene: Adelaide bore and "Turritella-beds," Aldinga Cliffs.

This species closely resembles in size and form *V. anguillinus*, Desh., of the Parisian Eocene, with actual specimens of which I have made comparison, but differs from it by more distant threads.

EPPLANATION TO PLATES VI. TO X.

N.B.—The figures are of the natural size, except when otherwise stated.

Plate VI.

Fig.
1. Natica sub-Noæ, *Tate*. Spring Creek, 2x.
2. Natica varians, *Tate*. Muddy Creek.
3. Natica substolida, *Tate*. Muddy Creek.
4. Natica gibbosa, *Hutton*. Murray Desert.
5. Natica Mooraboolensis, *Tate*. Moorabool River.
6. Natica subinfundibulum, *Tate*. Muddy Oreek.
7. Natica balteatella, *Tate*. Pliocene: Dry Creek-bore.
8. Natica subvarians, *Tate*. Aldinga Cliffs.
9. Natica varians, *Tate*. Muddy Creek.
10. Natica subvarians, *Tate*. Gippsland.

Plate VII.

Fig.
1. Calyptraea subtabulata, *Tate*. Table Cape.
2. Calyptraea crassa, *Tate*. Gippsland.
3. Calyptraea undulata, *Tate*. Muddy Creek.
4. Calyptraea placuna, *Tate*. Adelaide-bore.
5. Heligmope Demanti, *Tate*. Muddy Creek.
6. Calyptraea corrugata, *Tate*. Muddy Creek.
7. A young individual variation of *C. crassa*.
8. Capulus circinatus, *Tate*. Adelaide-bore.
9. Calyptropsis arachnoideus, *Tate*. Adelaide-bore.
10. Sigaretus microstira, *Tate*. Spring Creek.

Plate VIII.

Fig.
1. Turritella Aldingæ, *Tate*. Adelaide-bore.
2. Turritella Warburtoni, *Ten.-Woods*. Table Cape.
3. Turritella Murrayana, *Tate*. River Murray Cliffs.
4. Turritella acricula, *Tate*. River Murray Cliffs.
5. Turritella septifraga, *Tate*. Spring Creek.
6. Turritella Sturtii, *Ten.-Woods*. Table Cape.
7. Turritella conspicabilis, *Tate*. Gippsland.
8. Turritella tristira, *Tate*, var. Gippsland.
9. Turritella platyspira, *Ten.-Woods*. Muddy Creek.
10. Turritella pagodula, *Tate*. Gippsland.
11. Turritella gemmulata, *Tate*. Muddy Creek.

Plate IX.

Fig.
1. Thylacodes actinotus, *Tate*. Adelaide-bore.
2. Mesalia stylacris, *Tate*. Aldinga.
3. Thylacodes cratericulus, *Tate*. Mornington.
4. Turritella acricula, *Tate*, var. Gellibrand River.
5. Crepidula dubitabilis, *Tate*. Gippsland.
6. Turritella conspicabilis, *Tate*, var. Spring Creek.
7. Turritella acricula, *Tate*, var. Gippsland.
8. Thylacodes rudis, *Tate*. Table Cape.
9. Thylacodes Adelaidensis, *Tate*. Adelaide-bore.
10. Thylacodes asper, *Tate*. Gellibrand River.
11. Thylacodes conohelix, *Tenison-Woods*. Spring Creek.
12. Turritella acricula, *Tate*, var. Table Cape.

Plate X.

Fig.
1. Scalaria leptalea, *Tate*. Camperdown. Enlarged 5x., and magnified apex.
2. Euspira effusa. *Tate*. Adelaide-bore. Dorsal aspect and magnified portion of surface ; 2*a*. Aperture of another specimen.
3. Turritella tristira, *Tate*. Table Cape. Nat. size and magnified portion of surface.
4. Natica limata, *Tate*. Muddy Creek. Nat. size and portion of surface enlarged.
5. Natica Aldingensis, *Tate*. Adelaide-bore. (The carination is due to fracture in life.)
6. Natica Hamiltonensis, *Tate*. Muddy Creek.
7. Natica perspectiva, *Tate*. Muddy Creek. Enlarged 1·5x.
8. Natica arata, *Tate*. River Murray Cliffs.
9. Natica vixumbilicata, *Ten.-Woods* Table Cape.
10. Crossea semiornata, *Tate*. Spring Creek. Nat. size and portion of penultimate whorl enlarged.
11. Natica subinfundibulum, *Tate*. Muddy Creek. (Figures not correctly drawn.)

Notes on the Government Borings at Tarkaninna and Mirrabuckinna, with Special Reference to the Foraminifera observed therein.

By Walter Howchin, F.G.S.

[Read October 17, 1893.]

I have been indebted to Mr. J. W. Jones, Conservator of Water, for samples of the two bores which have yielded the results detailed below. In nearly every instance the quantity of material available for treatment has been exceedingly small, the samples not averaging, in the case of Tarkaninna, more than about a quarter of an ounce in weight when washed. The present list of occurrences cannot, therefore, be regarded as in any sense an exhaustive record of the foraminiferal fauna of the beds in question; but in our present limited knowledge of the fossils that pertain to the extensive formations of Cretaceous age in Central Australia they are worthy of record.

MIRRABUCKINNA.

This bore is situated about 20 miles north of the head of Lake Torrens, and 43 miles in a straight line south-west of Hergott. Six samples in all were examined from this boring, the depths being 40 ft., 50 ft., 95 ft., 100 ft., 128 ft., and 153 ft. respectively. The marine remains, so far as the present investigations have been carried, are limited to the first 50 ft. of the section, and belong to the Foraminifera, small fish remains, and traces of mollusca.

Foraminifera.

Reophax fusiformis, *Will.* (common).
Reophax scorpiurus, *Montf.* (common).
Haplophragmium agglutinans, *d'Orb.* (rare).
Haplophragmium canariense, *d'Orb.* (common).
Planispirina celata, *Costa* (mod. common).

Mollusca.

Fragments of a small *Lingula* not uncommon at 40 ft. and 50 ft.

Pisces.

Small fish remains are plentiful in the 50 ft. sample. These

consist of a small but very pretty lanceolate tooth, a very sharp spine probably belonging to the dorsal fin, vertebræ, scale, and a variety of small bones.

Flora.

In the two uppermost horizons examined (viz., 40 and 50 ft.) very minute seed vessels are common, associated with vegetable tissue, and a few pellets of hydrated oxide of iron. The seed vessels are crushed flat, but show pitted surfaces, and in some cases tripartite divisional lines.

The material from this bore was for the most part a loamy sand, somewhat dense in the dry state, but readily softened by a few hours' soaking in water. The residuum left from the washings was either a very fine sand, that passes freely through a sieve 75 threads to the inch, or minute crystals; the material being reduced in the process from rather less than a fourth to a third of the original weight. The 100-ft. sample is a dark shale, that required a little hand pressure to reduce. At 128 ft. a fine-grained conglomerate occurs, the embedded fragments consisting of a soft greenish slate (chloritic), more or less rounded, the matrix being the finer portions of the same slates reduced to a paste by trituration. The sample next the bed rock (153 ft.) is a somewhat curious bed—an argillaceous sand, thickly studded with small crystals of gypsum of a white or brownish colour, which constitute nearly one-fourth of the mass. Some of the samples from this boring carry a considerable quantity of drift wood and thin streaks of lignite, especially at 95 ft. Below the 50 ft. horizon no marine remains were observed, and the clays partake of a gypseous character. A paucity of fossils is characteristic of the gypseous beds of this formation, and may account for the absence of calcareous organisms in the lower parts of the section.

TARKANINNA.

This boring was put down on the Clayton, about 30 miles north-east of Hergott. It is by far the deepest bore which, up to the present time, has been made in the Cretaceous beds of the lakes district. Twenty samples were examined from the core of this section, ranging from near the surface down to 1,226 feet. The material was found to be fairly fossiliferous throughout, and would no doubt yield many more forms if examined in larger quantities. In many cases the material when washed was so limited that it could have been all held in a lady's thimble.

Name of Species.	Depth in Feet from Surface.																	
	1-44	44-120	151-276	276-298	298-307	307-326	525-530	530-540	540-570	766-864	864	916-952	952-1026	1050	1070	1070-1091	1091-1145	1145-1167	1167-1220	1220-1226
Hyperammina vagans, *Brady* ...	No organic remains—Material consists mainly of small crystals of gypsum.	...	...	...	...	...	...	...	...	?	...	...	...	...	...	...	No organic remains observed—Residium consists mainly of small crystals of gypsum.	...	..	...
Reophax fusiformis, *Will.*		...	x	...	...	...	...	...	x	...	x	x	...	x	...	...		...	...	...
Haplophragmium agglutinans, *d'Orb.*		...	...	...	...	x	...	...	x	x	...	...	...	...	...	...		...	...	...
" canariense, *d'Orb.*...		...	...	...	...	x	...	x	x	...	...	...	...	...	x	x		...	...	...
" australis, *Howchin, M.S.*		...	...	...	...	...	...	...	x	...	...	...	...	...	...	...		...	...	x
Thurammina compressa, *Brady* ...		...	...	...	...	...	...	...	...	...	...	...	...	x	...	...		...	x	...
Planispirina celata, *Costa*		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	x
Bigenerina digitata, *d'Orb.*		...	...	...	...	...	...	...	x	x	...	...	..	...	...	...		...	...	...
" nodosaria, *d'Orb.*		x	...	x	x	x	..	...	x	x	...	x	x	...	x	x		...	...	x
Verneuilina polystropha, *Rss.*		...	...	...	x	...	...	x	...	...	...	...	...	...	...	...		...	...	...
Gaudryina pupoides, *d'Orb.*		...	...	x	x	x	...	...	x	...	...	x	...	x	x	x		x	...	...
" scabra, *Brady*		...	...	...	...	...	...	...	...		...	...	...	...	...	...		...	...	x
" siphonella, *Rss.*		...	...	...	...	...	...	...	...	...	...	...	...	...	x	...		...	...	...
Vaginulina legumen, *Linn.*		...	...	...	...	...	x	...	...	..	...	...	...	x	...	x		x	x	...
Marginulina costata, *Batsch.* ...		...	...	...	...	...	...	x	...	...	...	...	...	...	...	...		...	...	...
" glabra, *d'Orb.*		...	...	...	..	...	x	...	x	...	...	...	...	...	...	...		...	...	...
Cristellaria crepidula, *F. & M.* ...		...	...	...	..	...	...	...	...	x	...	...	...	...	...	...		x	...	...
" gibba, *d'Orb.*		...	...	...	...	...	...	...	...	...	x	...	...	...	...	...		...	...	...
Anomalina ammonoides, *Rss*... ..		...	..	...	...	...	...	...	...	..	...	...	...	...	...	...		...	...	x
Pulvinulina elegans, *d'Orb.*		...	...	...	...	x	...	...	x	...	x	...	x	...	...	...		...	...	...

As in the case of the borings at Hergott and Mirrabuckinna the Tarkaninna section, although of much greater thickness, preserves a wonderful sameness of character throughout its entire depth, both in its lithological character and palæontological remains. The same similarity is observed when the respective borings are compared with each other, a majority of the species occurring in common over the geological area in question. The respective borings have evidently passed through beds of contemporaneous age, and which must have been deposited under remarkably uniform conditions. This deposit, although between 1,200 and 1,300 feet thick at Tarkaninna, must have had a slow rate of deposition to admit of the presence of Foraminifera living upon the sea bottom. On the other hand, the comparative rarity of marine organisms in this formation, and the remarkable preponderance of the arenaceous types of Foraminifera over those with hyaline tests, seem to point to the presence of muddy water, and a relatively rapid accumulation of sediment on the sea-floor.

The Microzoa observed, other than Foraminifera were, a few entomostraca, fragments of a small *Lingula*, traces of echinoderms, one or two small fish bones, vegetable tissues, and cylindrical pyritous casts.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1892-93.

ORDINARY MEETING, NOVEMBER 3, 1892.

Prof. R. TATE, F.G.S., F.L.S. (President), in the chair.

ALTERATION OF RULES.—The following alteration of rules was carried, namely :—

Rule 36, to read "at a meeting," and not "next before the month of October."

Rule 37, to omit the words "a Secretary," and insert the words "two Secretaries."

Rule 48, instead of "Secretary" to read "two Secretaries."

Rule 49, instead of "Secretary" to read "Secretaries," and instead of "Honorary Secretary" to read "Honorary Secretaries."

ELECTION.—W. C. Grasby was elected the additional Hon. Secretary.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited the lower jaw of a fossil wombat, obtained from the bed of Lyndoch Creek. The fossil had been subjected to much attrition, and the teeth were exposed in their alveoli. The specimen belonged to an adult, but of a smaller species than any now existing. J. G. O. TEPPER, F.L.S., showed some ixias from Lyndoch, which were perfectly white.

PAPERS.—"A Forgotten Relic of Australian Exploration," by E. C. STIRLING, M.D., C.M.G., &c. "Two New Fungi for South Australia," described by Prof. LUDWIG, in the *Zeitschrift zür Planzenkrankheiten* (1892), and communicated by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, DECEMBER 6, 1892.

Prof. TATE, F.G.S., F.L.S. (President), in the chair.

BALLOT.—P. H. PRIESTLEY was elected a Fellow.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited the fruits of *Posidonia australis*. Prof. TATE, F.G.S., showed specimens of

Convolvulus sepium in flower, gathered near the Frome Bridge, Adelaide. Also a specimen of the so-called lias-limestone, from the cement works at Brighton. He pointed out that it had no petrological relationship with the true Lias limestone of Europe, the latter being argillaceous limestone, whilst the Brighton sample is siliceous. He expressed the opinion that the specimen exhibited did not in itself contain the constituents for forming a good cement. Oswald Lower, F.Ent.S., laid on the table specimens of the male and female butterfly *Teinopalpus imperialis*.

Papers.—Papers relating to the Elder Exploring Expedition were contributed by Victor Streich; Baron F. v. Mueller and Prof. Tate, F.G.S.; and Dr. Stirling and A. Zietz (the Assistant Director of the Museum).

Ordinary Meeting, February 7, 1893.

Maurice Holtze, F.L.S. (Vice-President), in the chair.

Recognition of Merit.—The Chairman referred to the honor conferred upon Prof. Tate, F.G.S. (their President), in being awarded the Clark Memorial Medal, by the Royal Society New South Wales, in recognition of his services as a worker in the domains of science: especially for his numerous and invaluable contributions to the geology and palæontology of Great Britain and South Australia.

Exhibits.—Maurice Holtze, F.L.S., laid on the table a painting by Miss Tepper of the *Victoria Regia*, at present in bloom in the Botanic Gardens of Adelaide. J. G. O. Tepper, F.L.S., exhibited a specimen of the family *Heterogamidæ*, hitherto unknown in South Australia, and collected at Fowler's Bay by Prof. Tate, F.G.S. The species was new, and had been named by Mr. Tepper *Ataxigamia Tatei*.

Oswald Lower, F.Ent.S., showed specimens of the genus *Ogyris* of Westwood (*Fam. Lycænidæ*.) Of the nine species known seven were exhibited, five of these being native to South Australia.

Ballot.—Robert Brummitt, M.R.C.S., Eng., and Victor Streich were elected Fellows.

Papers.—"The Flora of Roebuck Bay, W.A." by J. G. O. Tepper, F.L.S. "A few words about Pearls," by A. F. Calvert, "List of Rhopalocera," by Oswald Lower, F.Ent.S.

Ordinary Meeting, March 7, 1893.

Maurice Holtze, F.L.S. (Vice-President), in the chair.

Exhibits.—Oswald Lower, F.Ent.S., forwarded a specimen of South African Moth, *Leto Venus*, one of the most resplendent

of the *Hepialidæ*. J. G. O. Tepper, F.L.S., exhibited *Pomaderris vaciniifolia*, new for South Australia, and collected on the hill tops bounding the River Torrens Gorge. Maurice Holtze, F.L.S., showed specimens of maize in which the male flowers had taken on the characters of the female, and *vice versa*.

Ballot.—Thomas James, M.R.C.S., Eng., and W. T. Bednall were elected Fellows.

Papers.—"The Blattariæ of Australia and Polynesia," by J. G. O. Tepper, F.L.S. "The Mirrn-Yong Heaps at Morgan, South Australia," by R. Etheridge, jun., F.G.S.

Ordinary Meeting, April 4, 1893.

Prof. Tate, F.G.S., F.L.S., (President), in the chair.

Ballot.—R. H. Perks, M.D., was elected a Fellow.

Exhibits.—J. G. O. Tepper, F.L.S., showed a new parasite (*Thalpochares dubia*, Butler) of the black scale, *Lecanium testudo*. Prof. Tate, F.G.S., exhibited for Mr. Marsh, of Broken Hill, N.S.W., a new mineral of iodide of copper, which Prof. Liversidge had named "Marshite." Oswald Lower, F.Ent.S., forwarded specimens of *Morpho Sulkowskyi*, a Brazilian butterfly.

Motion.—It was carried "that the Council of the Society make enquiries of the Queensland Government as to whether Mr. F. M. Bailey, the Government Botanist, is authorised by it to write a continuation of or supplement to the "Flora Australiensis," of Bentham and Mueller, and that in the event of a reply being received in the affirmative, that the Council be instructed to protest against the assumption of the title for the proposed work.

Papers.—"Description of a New Mineral (Stibiotantalite)," by G. A. Goyder, F.C.S. "Description of a New Genus, and Five Species of Australian Nitidulidæ and Colydiidæ," by E. Grouvelle. "Descriptions of New Australian Coleoptera," by Rev. Thomas Blackburn, B.A.

Ordinary Meeting, May 2, 1893.

Prof. Tate, F.G.S., F.L.S. (President), in the chair.

Exhibits.—Prof. Tate, F.G.S., exhibited a collection of Silurian Fossils, from the MacDonnell ranges, forwarded by Mr. Thornton, comprising fifteen species. R. W. Chapman, M.A., brought under the notice of the meeting a collection of electrical breath-figures prepared by himself, together with photographs of the same.

PAPERS.—"Correlation of Marine Tertiaries of Australia (part I.)," by Prof. TATE, F.G.S. and JOHN DENNANT, F.G.S. "Descriptions of New Lepidoptera," by OSWALD LOWER, F.Ent.S.

ORDINARY MEETING, JUNE 6, 1893.

Prof. TATE, F.G.S., F.L.S. (President), in the chair.

RECOGNITION OF MERIT.—The President drew the attention of the meeting to the distinctions recently conferred by Her Majesty the Queen on two of the Fellows of the Society, namely, Sir Charles Todd, K.C.M.G., and Dr. E. C. Stirling, C.M.G., both of whom had taken an active part in the Society's work in the past. It was carried that the Society record its congratulations.

BALLOT—URIAH DUDLEY was elected a Fellow.

EXHIBITS.—MAURICE HOLTZE, F.L.S., exhibited chipped tools made by the aborigines of Western Australia from glass bottles, also specimens of the true "rose of Jericho" (*Asteriscus pygmæa*) and the Californian "resurrection plant" (*Selaginella lepidophylla*). W. T. BEDNALL, showed specimens of rare exotic shells, and drew particular attention to a cast of *Pleurotomaria Adansoniana*, the original of which was taken off Tobago, West Indies. WALTER GILL, F.L.S., laid on the table dates from six years old palms, growing at Hergott Springs, S.A.

PAPERS.—"Poisonous Constituents of *Stephania hernandifolia*," by Prof. RENNIE, D. Sc., and E. F. TURNER. "New Species of Australian Marine Gastropoda," by Prof. TATE, F.G.S. "Additions to the List of S.A. Marine Gastropods," by Prof. TATE, F.G.S. "Descriptions of S.A. Brachyscelid Galls," by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, JULY 4, 1893.

Prof. TATE, F.G.S., F.L.S. (President), in the chair.

BALLOT.—LAURENCE BIRKS was elected an Associate.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited specimens of igneous and metamorphic rocks from Granite Island, Port Victor, and The Bluff, Encounter Bay, showing how in parts the granite appeared to be intrusive and in others bedded. Also from the same localities, specimens of diorite, the only other known place for the occurrence of this mineral in South Australia being Kangaroo Island. J. G. O. TEPPER, F.L.S., showed *Carteria acaciæ* (Maskell), a brachyscelid, which instead of forming galls, is covered with thick reddish waxy tests. These were forwarded from Central Australia by Miss Dickenson. Also *Cylindrococcus amplia* (Maskell) as occurring on *Casuarina quadrivalvis* at Mt. Lofty. Mr. Maskell had recently placed

this and another genus in the new sub-family *Idiococcinæ*. Also *Inglesia foraminifer* as infesting *Santalum acuminatum*, a New Zealand species of scale-insect, recorded for the first time as occurring in South Australia. He also reported that *Icerya Purchasi* had attacked a species of *Cocoloba*, a leafless plant of South Africa.

Papers.—"Respecting the Anthropology of the Daly River (N.T.) Aborigines," by Rev. Donald Mackillop, S.J.

Ordinary Meeting, August 1, 1893.

Prof. Tate, F.G.S., F.L.S. (President), in the chair.

Ballot.—Rev. Donald Mackillop, S.J., was elected a Corresponding Member.

Exhibits.—Maurice Holtze, F.L.S., laid on the table from the Adelaide Botanic Gardens, the sheathing spathe of a leaf of *Kentia Wendtlandi*, a Northern Territory palm, used by the aborigines for making into vessels, &c., for holding water. This use is limited to the locality in which the palm is indigenous. Prof Tate, F.G.S., exhibited a species of *Euomphalus* indicative of the Silurian epoch, obtained far to the east of the MacDonnell Range. Also a specimen of *Turbo Jourdani*, a large and rare marine shell, obtained in a sub-fossilised state from the silt of the Port Creek, at a depth of about 24 feet. J. G. O. Tepper, F.L.S., showed a collection of the coleoptera and hymenoptera from the Elder Exploring Expedition.

Paper.—"Customs and Superstitions of the Aboriginal Tribes, Gulf of Carpentaria," by W. G. Stretton, S.M.

Ordinary Meeting, September 5, 1893.

Prof. Tate, F.G.S., F.L.S. (President), in the chair.

Ballot.—W. G. Stretton, S.M., was elected a Corresponding Member.

Exhibits.—J. G. O. Tepper, F.L.S., laid on the table a specimen of *Calla Æthiopica* with three spathes from one stalk. Also *Crinum flaccidum* from Wilcannia, River Darling. Also *Acacia pravifolia* from Gawler, a new locality. J. J. East, F.G.S., illustrated and described some unrecorded skeletal characters of *Coscinocyathus Tatei*, a coral of the *Archæocyathinæ* family, from the Cambrian limestone, at the Elvina Mine, eleven miles N.W. of Beltana. J. J. Eckert forwarded analyctical drawings of *Darwinia Schuermanni* with a short biographical sketch of the late Rev. C. W. Schuermann, after whom the plant had been named by Baron F. von. Mueller in 1851 from specimens collected at Port Lincoln, S.A.

Paper.—"Notes on the Lacustrine Origin of the Mammaliferous Deposit at Lake Mulligan, S.A.," by Prof. Tate, F.G.S.

ANNUAL MEETING, OCTOBER 17, 1893.

Prof. TATE, F.G.S., F.L.S. (President), in the chair.

AUDITOR.—D. J. ADCOCK was elected Auditor, for the current year.

BALLOT.—MARQUIS DE GREGORIO, Palermo, and M. COSSMANN, Paris, were elected Honorary Fellows of the Society.

REPORTS.—The Annual Report of the Council and Balance-sheet were read and adopted. The Annual Reports and Balance-sheets of the Field Naturalists' Section, the Microscopical Section, and the Astronomical Section, were accepted.

ELECTION OF COUNCIL.—The Council for the ensuing year was elected as follows:—President, Prof. Tate, F.G.S., F.L.S.; Vice-Presidents, Rev. Thomas Blackburn, B.A., and Maurice Holtze, F.L.S.; Hon. Treasurer, Walter Rutt, C.E.; Hon. Secretaries, W. L. Cleland, M.B., and W. C. Grasby; Members of Council, Prof. Rennie, D.Sc., E. C. Stirling, M.D., C.M.G., F.R.S., Walter Howchin, F.G.S., Samuel Dixon, J. S. Lloyd, and W. B. Poole.

ALTERATION OF RULES.—The alterations in rules 36, 37, 48 and 49 made at the November meeting were confirmed.

EXHIBITS.—W. G. HOWCHIN, F.G.S., exhibited a fossil sponge *Hyalostelia* from the Silurian rocks of the McDonnell Range, forwarded by Mr. THORNTON, of Temple Downs. The only other site where it is known to occur in South Australia is in the Cambrian Rocks at Curramulka. J. G. O. TEPPER, F.L.S., showed a collection of plants from the S.W. of Western Australia. GEORGE SWEET, F.G.S., forwarded through Prof. Tate, F.G.S., specimens of the fossil flora of the Leigh Creek coal-basin, which contained the following:—*Thinnfeldia odontopteroides*, and *T. media; Equisetum*, two species; *Tæniopteris*, two species; *Macrotæniopteris Wianamattæ; Trichomanites laxum (?);* and *Otozomanites*, new species.

PAPERS.—"Notes and Remarks of S.A. Rhopalocera," by J. G. O. TEPPER, F.L.S. "New Australian Heterocera," by OSWALD LOWER, F.Ent.S. "Descriptions of New Coleoptera," by Rev. THOS. BLACKBURN, B.A. "Gastropods of the Older Tertiaries, Australia" and "New Fossil Gastropods," by Prof. TATE, F.G.S.

ANNUAL REPORT.

The Council has to report that the scientific work of the Society has been carried on successfully during the past year. In addition to papers from local workers, the Society has received valuable contributions from scientific authorities in Europe, to whom material had been forwarded for critical determination. Part I. of the current year's transactions was published in July, and it is anticipated that part II., completing vol. XVII., will be ready for distribution in December. As has before been stated, vol. XVI. has been reserved for the scientific results of the Elder Exploring Expedition, of which parts I. and II. have already been published.

During the past year two Corresponding Members have been elected, viz., the Rev. D. Mackillop, S.J., and W. G. Stretton, who have both added to our knowledge of the ethnology of the Northern Territory of South Australia. There have also been elected seven Fellows and one Associate. You will also be asked to ballot as Honorary Fellows the two distinguished scientists, Marquis de Gregorio and M. Cossmann, whom the Council has thought proper to recommend on account of their valuable services to the Society and their distinguished position in science.

The following Fellows have resigned :—Edwin Ashby, E. C. Saunders, and W. Russell ; and as an Associate—Mrs. Hodgson, who was elected in 1884.

The following Fellows have had their names removed by the Council for non-payment of arrears of subscription :—Thomas Eyers, A. T. Magarey, M. Salom, J. J. Stuckey, and P. H. Priestley.

The Council has also the melancholy duty of reporting the death of two Fellows—Dr. Renner and Dr. Davies Thomas.

In the premature death of Dr. Davies Thomas science lost one of her most ardent and indefatigable students in a domain which he had made all his own, namely, the study of the life-history in Australia of Hydatids. The medical bearing of most of the subject rendered the Transactions of this Society not the best suited for the publication of the results of Dr. Davies Thomas' researches, hence the small reference made to them in its pages. A monograph, however, is in the press dealing with the whole subject of his investigations, and containing as well some posthumous articles of Dr. Davies Thomas, which will form a

fitting memorial of one distinguished alike for his ability and industry.

The membership of the Society consists at the present time of 11 Hon. Fellows, 75 Fellows, 16 Corresponding Members, and 1 Associate.

Three new exchanges with learned Societies have been made, namely, the Stavanger Museum, Norway; the Annuaire Géologique, Paris; and the Société des Sciences Naturelles de l'Ouest de France, Nantes.

It has been noticed with satisfaction that Baron v. Mueller has decided to publish additional and supplementary volumes to the classical "Flora Australiensis."

Since the last annual meeting it has been decided to have two Hon. Secretaries instead of one, so that more attention might be given to the arrangement and care of the many valuable serial publications which the Society is constantly receiving from all parts of the world. For this purpose a slight verbal alteration of some of the rules was rendered necessary, and duly carried out at a general meeting. The date fixed for the election of an Auditor was also altered.

The statement of receipts and expenditure shows that the publication item has been extremely heavy during the past year.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.
Oct. 1, 1892.						
To Balance				276	9	6
" Subscriptions—						
Royal Society	70	1	0			
Field Naturalists' Section ...	17	0	0			
Microscopical Section	5	0	0			
Astronomical Section	7	0	0			
				99	1	0
" Grant from Government				118	9	0
" Interest				7	8	0
" Sale of Transactions				7	10	0
				£508	17	6

Cr.	£	s.	d.	£	s.	d.
By Cost of Transactions—						
Printing and Binding (Annual Volume)	150	7	7			
Illustrating (Annual Volume) ...	20	17	6			
Publishing " " ...	9	0	10			
Elder Exploration Volume ...	152	1	1			
				332	7	0
" Wages—Caretaker				3	0	0
" Printing, Postage, and Stationery...				9	18	11
" Advertising				9	0	5
" Library—Binding				25	10	0
" Grants—Field Naturalists' Section	20	0	0			
Microscopical Section ...	5	0	0			
				25	0	0
Sept. 30, 1893.						
By Balance—Union Bank	52	13	2			
Savings Bank	51	8	0			
				104	1	2
				£508	17	6

Audited and found correct.

D. J. ADCOCK, Auditor.

Oct. 12, 1893.

WALTER RUTT, Treasurer.

DONATIONS TO THE LIBRARY

For the Year 1892-93.

TRANSACTIONS, JOURNALS, AND REPORTS.

Presented by the respective Societies, Editors, and Governments.

Argentine States.

Buenos Aires—Boletin de la Academia Nacional de Ciencias, tomes X. and XI.

Austria and Germany.

Berlin—Verhandlungen Gesellschaft für Erdkunde, band XIX., Nos. 6 to 10; XX., Nos. 1 to 6.

——— Zeitschrift, ditto, band XXVI.; XXVII., Nos. 2 to 6; XXVII., Nos. 1 and 2.

——— Sitzungsberichte Königlich Preussischen Akademie der Wissenschaften zu Berlin, Nos. 26 to 55, 1892.

——— Abhandlungen der Königlich Preussischen Meteorologischen Instituts:—Ergebnisse der Niederschlogs Beobachtungen, im er Jahre 1891. Ergebnisse der Meteorologischen Beobachtungen, heft I., II., III., 1892.

Bonn—Naturhistorischen Vereins der Preussischen-Rheinlande Westfalens und des Reg:—Bezirks Osnabruch, verhandlungen hälpte 1, 2, 1892.

Freiburg—Berichte über des Verhandlungen des Gesellschaft für Beförderung der Natur-Wissenschaften; publications from 1855 to 1885 and band I. to VI.

Giessen—Oberheissischen Gesellschaft fur Natur und Heilkunde, Report 29.

Gottingen—Nachrichten von der K. Gesellschaft der Wissenschaften u. der Georg-August Universitat, Nos. 1 to 11, 1891; 1 to 10, 1893.

Halle—Leopoldina. heft 27, 1891.

——— Nova Acta der K. Leop. Carol. Deutchen Akad. der Naturforscher, band LV., No. 6; LVI., No. 2; LVII., No. 4; LVIII., No. 1.

Vienna—Verhandlungen der K. K. Geologischen Reichenstalt, Nos. 6 to 18, 1892; Nos. 1 to 5, 1893.

Vienna—Kaiserliche Akad. der Wissenschaften in Wien, Nos. 19 to 27, 1892; Nos. 1 to 19, 1893.
——— K. K. Gradmessungs-Bureau, Astronomische Arbeiten, band IV.
——— Verhandlungen der K. K. Zoologisch-Botanischen Gesellschaft in Wien, band XLII., quart. 1 and 2.
——— Annalen des K. K. Naturhistorischen Hof Museums, band VII., Nos. 1 to 4; band VIII., Nos. 1 and 2.
Wurzburg—Zitzungsberichte der Physikalisch-Medicinischen Gesellschaft Nos. 1 to 10, 1892.

BELGIUM.

Brussels—Annales Société Royale Malacologique, tome XXVI., 1891.

BRAZIL.

Rio de Janeiro—Annales de l' Observatiore Impêriale; Le Climate de Rio de Janeiro; Annuario, 1892.

CANADA.

Halifax—Proceedings Nova Scotian Institute of Natural Science, vol. I., part 1 (second series).
Montreal—Canadian Record of Science, vol. V., Nos. 1 and 3 to 5.
———— Geological and Natural History Survey of Canada, Annual Report, 1888-89; Maps.
Toronto—Transactions Canadian Institute, vol. II., part 5; vol. III., part 1.

CAPE COLONY.

Cape Town—Transactions of South African Philosophical Society, vol. VI., parts 1 and 2.

CHILE.

Santiago—Archives de la Société Scientifiqia, tomes II., Nos. 1 to 3.

FRANCE.

Angers—Bulletin de la Société d' Etudes Scientifiques d' Angers, année XX., 1891.
Caen—Bulletin de la Société Linnéenne de Normandie, vols. IV. and V., 1890 and 1891.
Havre—Bulletin de la Société Géologique de Normandie, vol. XIII., Nos. 87 to 89.
Nantes—Bulletin de la Société des Sciences Naturelles de l' Ouest de la France, vol. I., Nos. 1 to 4; vol. II., Nos. 1 to 3.

Paris—Feuilles des Jeunes Naturalistes, series III., Nos. 264 to 275.

—— Bulletin Entomologique, pp. 201 to 280, 1892; and 1 to 272, 1893.

Great Britain and Ireland.

Belfast—Report and Proceedings Belfast Natural History and Philosophical Society, session 1891-92.

Dublin—Transactions Royal Irish Academy, vol. XXX., parts 1 to 4.

——— Proceedings ditto, vol. II. (third series), Nos. 3 and 4.

——— Scientific Proceedings Royal Dublin Society, vol. VII., parts 3 and 4.

——— Transactions ditto, vols. IX. to XIII.

Edinburgh—Royal Physical Society, session 1891-92.

London—Journal Royal Microscopical Society, parts 5 and 6, 1892; and 1 to 4, 1893.

——— Proceedings Royal Society, Nos. 313 to 325.

——— Catalogue British Museum—Birds, vols. XVI. and XVII.

——— Royal Colonial Institute, Proceedings, vol. XXIII.

——— Entomological Society, Transactions, 1890-91-92.

——— Chemical Society, Journal, vols. LXIII. and LXIV.

——— Kew Gardens, Bulletins, 1892.

Leeds—Journal of Conchology, vol. VII., Nos. 1 to 7.

Manchester—Memoirs and Proceedings Manchester Literary and Philosophical Society, vol. V., No. 2; vol. VI., vol. VII., Nos. 1 to 3.

———— Journal Manchester Geographical Society, vol. VII., Nos. 10 to 12; vol. VIII., Nos. 1 to 6.

India.

Calcutta—Indian Museum—Economic Entomology, vol. II., No. 6; vol. III., Nos. 1 and 2. List of Batrachians.

Italy.

Turin—Bolletino dei Musie di Zoologia ed Anatomia Comparata dello R. Università di Torino, vol. VII., Nos. 127 to 135; vol. VIII., Nos. 136 to 150.

Pisa—Atti dello Società Toscana de Scienze Naturali, vol. VIII., pp. 85 to 148 and 175 to 232.

Japan.

Tokio—Journal College of Science, Imperial University, vol. V., parts 3 and 4; vol. VI., parts 1 and 2.

—— Calendar, 1891-92.

Mexico.

Mexico—Memoirs de la Sociedad Cientifica (Antonio Alzate), tomo VI., Nos. 1 to 6 and 9 to 10.

New South Wales.

Sydney—Records of the Australian Museum, vol. II., No. 4; Report of Trustees for 1892.
——— Monographs Australian Museum; Catalogue XV., part 3, Marine Shells of Australia and Tasmania; Calalogue XVI., Australian Mammals: Report of Museum, 1891.
——— Technological Museum, Technical Education Series, No. 10.
——— Australian Association Advance. Science, vol. IV.
——— Department of Mines—Records Geological Survey, vol. III., parts 1 to 3; Memoirs ditto, Palæontology, No. 5; Echinodermata, Annelida and Crustacea of the Permo-Carboniferous; Annual Reports, 1892.
——— Agricultural Gazette, vol. II., parts 8 to 12; vol. III., parts 10 to 12; vol. IV., parts 1 to 8.
——— Proceedings Linnean Society, vol. VII., parts 2 to 4; vol. VIII., part 1.
——— Proceedings Royal Society, N.S.W., vol. XXVI.
——— Sydney Observatory—Reports
——— Sydney University—Calendar, 1893.

New Zealand.

Wellington—Colonial Museum and Laboratory—Annual Report (twenty-seventh).
———— Transactions and Proceedings New Zealand Institute, vol. XXV., 1892; Manual of New Zealand Coleoptera, parts 5, 6, and 7.

Norway and Sweden.

Bergen—Bergens Museum Aarsberetning, 1891.
Stavanger—Museum, Aarsberetning, 1891.
Upsala—University—Geological Bulletin, vol. I., No. 1.
Stockholm—Geologisha Föreningens, band XIV., hefte 6 and 7.
———— Entomologisk Tidskrift, hefte 1 to 4, 1893.
Trondjem—Société Royale Norwégienne des Sciences, skrifter, 1891.

Queensland.

Brisbane—Bulletin Department of Agriculture, Nos. 20 and 21.
——— Annual Report Queensland Museum, 1891-92.
——— Reports of Geological and Palæontological Survey.
——— Proceedings Royal Society of Queensland, 1892-93.

Russia.

Kiew—Memoirs de la Société des Naturalistes, tome XII., parts 1 and 2
Moscow—Bulletin de la Société Impériale des Naturalistes, Nos. 2 to 4, 1892; and No. 1, 1893.
St. Petersburg—Bulletin du Comité Geologique, vol. XI., Nos. 1 to 10; vol. XII., Nos. 1 and 2.

South Australia.

Adelaide—Report Board of Governors Public Library, Museum, and Art Gallery, 1891-92.
——— Meteorological Obsevations, Adelaide Observatory, 1890 (Sir Charles Todd, M.A., K.C.M.G., F.R.S.).
——— Weather Reports, ditto, 1892-93.
——— Government Geologist's Department Reports.

Straits Settlements.

Perak—Government Gazette.

Switzerland.

Geneva—Compte Rendu des Séances de la Société de Physique et d'Histoire Naturelle, Memoirs (Centenaire), No. IX., 1892.
Lausanne—Bulletin de la Société Vaudoise des Sciences Naturelles, vol. XXVIII., 107 to 109; vol. XXIX., 110 to 111.

Tasmania.

Hobart—Parliamentary Papers.
——— Royal Society of Tasmania—Abstract of Proceedings, 1892.

United States America.

Baltimore—John Hopkins' University Studies, series X., Nos. 4 to 11.
——— Circulars ditto, vol. XI., Nos. 101 to 104; vol. XII., Nos. 105 to 107.
——— American Chemical Journal, vol. XIV., Nos. 2 to 7.
Boston—Proceedings American Academy Arts and Sciences, vol. XVIII., 1890-91.
——— Proceedings Boston Society Natural History, vol. XXV., parts 3 and 4, 1891-92.
——— Memoirs Boston Society Natural History, vol. IV., No. 10, 1892.

Cambridge—Bulletin Museum Comparative Zoology at Harvard College, vol. XXIII., Nos. 4 to 6; vol. XXIV., Nos. 1 to 5; vol. XVI., Nos. 11 and 12. Annual Report Curator, 1891-92.

———— Psyche—Journal of Entomology, vol. VI., Nos. 198 to 208.

Cincinnati, Ohio—Journal of Natural History, vol. XV., Nos. 2 to 4.

Grenville, Ohio—Bulletin Scientific Laboratories, Denison University, vol. VII.

New York—Transactions New York Academy of Sciences, vol. X., Nos. 7 to 8; vol. XI., Nos. 1 to 5.

———— Annals ditto, vol. VI., Nos. 1 to 6.

———— Journal New York Microscopical Society, vol. VIII., No. 4; vol. IX., Nos. 1 to 3.

Philadelphia—Proceedings Academy Natural Sciences, parts 1 to 3, 1892.

———— Contributions to the University Herbarium, vol. I.

Rochester—Proceedings Rochester Academy of Science, vol. II.

Salem—Proceedings American Association for the Advancement of Science, 1891 and 1892.

San Francisco—Proceedings Californian Academy of Sciences, vol. III.; Evolution of the Colors of North American Birds.

St. Louis—Missouri Botanical Gardens Report, 1892.

———— Transactions of Academy of Sciences, vol. V., Nos. 3 and 4; vol. VI., No. 1.

Washington—Bulletin of the U.S. Geological Survey; Mineral Resources of the United States, 1889-90.

———— National Academy of Sciences Memoirs, vol. V.

———— Smithsonian Institution—Report, 1890; Annual Report Bureau Ethnology, 1885-86; Report U.S. National Museum, 1890; Life Histories of N.A. Birds; Bibliography Algonquian Language; ditto Athapascan Language; Dakota-English Dictionary.

———— U.S. Department of Agriculture—Reports on Condition of Crops; Report of Secretary, 1893; Reports of Statistician; Treatment of Lumpy Jaw; Report Numbers and Values of Farm Animals; Distribution and Consumption of Corn and Wheat; Experiments with Sugar Beet and Sorghum; Agricultural Survey of Wyoming; Hawks and Owls of United States; North American Fauna, No. 7; Death Valley Expedition, part II.

VICTORIA.

Bendigo—School of Mines Annual Report, 1892.
Melbourne—Victorian Naturalist, vol. IX., Nos. 7 to 12; vol. X., Nos. 1 to 4.
———— Transactions Royal Geographical Society of Australasia (Victorian Branch), vol. X.
———— Proceedings Royal Society of Victoria, vol. IV., part 2, and vol. V.

MONOGRAPHS AND BOOKS.

Presented by the respective Societies, Museums, Governments, and Authors.

Thompson, Geo. M., F.L.S.—Notes on Tasmanian Crustaceæ, with Descriptions of New Species.
Kew Gardens, Director of—Flora Hongkongensis (Bentham).

LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1893.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election.

HONORARY FELLOWS.

1857. BARKELY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
1893. COSSMANN, M., Rue de Maubeuge, 95, Paris.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer, Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Palæontologist to the Geological Survey of New South Wales, Sydney.
1853. GARRAN, A., LL.D., Sydney, N.S.W.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1878. JERVOIS, SIR W. F. D., K.C.M.G., C.B., F.R.S., Ex-Governor of South Australia, London, England.
1855. LITTLE, E.
1879. *MUELLER, BARON F. VON, K.C.M.G , F.R.S., M. and Ph.D., F.G.S., F.R.G.S., F.C.S., C.M.Z.S., &c., &c., Government Botanist, Melbourne, Victoria.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer, N.S.W., Sydney, New South Wales.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Camberwell, Melbourne, Victoria.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
1878. *HAYTER, H. H., M.A., C.M.G., F.S.S., Government Statist, Melbourne, Victoria.
1880. *KEMPE, REV. J., Hermannsburg, Charlotte Waters, South Australia.
1889. *MACGILLIVRAY, P. H., M.R.C.S., F.L.S., Bendigo, Victoria.
1893. *MCKILLOP, REV. DAVID, S.J., Superior Daly River Mission, Northern Territory.
1892. *MAIDEN, J. H., Curator Technological Museum, Sydney, New South Wales.
1888. *MASKELL, W. M., Wellington, New Zealand.
1886. NICOLAY, REV. C. G., Fremantle, Western Australia.
1880. *RICHARDS, MRS. A., Georgetown, South Australia.
1892. *SCHULZ, REV. LOUIS, Hermannsburg, Charlotte Waters, South Australia.
1883. *STIRLING, JAMES, F.L.S., Assistant Geological Surveyor, Victoria.
1893. *STRETTON, W. G., Palmerston, Northern Territory.

FELLOWS.

1887. Adcock, D. J., Adelaide, S.A.
1874. Angas, Hon. J. H., M.L.C., Adelaide, S.A.
1887. Bagot, John, Adelaide, S.A.
1893. *Bednall, W. T., Adelaide, S.A.
1887. *Blackburn, Rev. Thomas, B.A., Woodville, S.A.
1890. Board, Gregory, Metallurgist Port Pirie Smelting Works, Port Pirie, S.A.
1884. Boettger, Otto, Adelaide, S.A.
1886. *Bragg, W. H., M.A., Professor of Mathematics University of Adelaide, S.A.
1882. Brown, L. G., Adelaide, S.A.
1883. *Brown, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
1893. Brummitt, Robert, M.R.C.S., Eng., Kooringa.
1884. Bussell, J. W., F.R.M.S., North Adelaide, S.A.
1891. Calvert, A. F., Adelaide, S.A.
1888. Chapman, R. W., M.A., B.C.E., Lecturer on Mathematics and Physics University of Adelaide, S.A.
1879. *Cleland, W. L., M.B., Ch.M., F.R.M.S., J.P., Assistant Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, S.A.
1876. (L) Cooke, E., Commissioner of Audit South Australia, Adelaide.
1880. Cox, W. C., Semaphore, S.A.
1887. *Dixon, Samuel, Adelaide, S.A.
1876. Dobbie, A. W., Adelaide, S.A.
1893. Dudley, U., Broken Hill, N.S.W.
1890. *East, J. J., F.G.S., Registrar School of Mines, Adelaide, S.A. (Corresponding Member, 1884).
1871. Elder, Sir Thomas, K.C.M.G., Adelaide, S.A.
1886. Fleming, David, Adelaide, S.A.
1876. Fletcher, Rev. W. Roby, M.A., Kent Town, S.A.
1882. Fowler, William, Kulpara, S.A.
1889. Fraser, J. C., Adelaide, S.A.
1891. Gill, Walter, F.L.S., Conservator of Forests South Australia, Adelaide.
1880. *Goyder, George, Jun., F.C.S., Government Analyst South Australia, Adelaide.
1890. Gray, Rev. William, Tanna, New Hebrides.
1887. Grasby, W. C., Editor *Garden and Field*, Adelaide, S.A.
1861. Hay, Alexander, Adelaide, S.A.
1882. Henry, Alexander, M.D., Adelaide, S.A.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gordens, Adelaide (Corresponding Member, 1882), Adelaide, S.A.
1883. *Howchin, Walter, F.G.S., Goodwood, S.A.
1883. Hughes, H. White, Booyoolie, S.A.
1893. James, Thos., M.R.C.S., Eng., Moonta.
1891. Johnson, J., M.D., F.R.C.S., Medical Officer, Mount Gambier Hospital, Assistant Colonial Surgeon, Mount Gambier, S.A.
1853. (F) Kay, Robert, General Director and Secretary S.A. Public Library, Museum, &c., Adelaide, S.A.
1884. Lendon, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital and Children's Hospital, North Adelaide, Adelaide, S.A.
1856. Lloyd, J. S., Adelaide, S.A.

1888. *Lower, O. B., Parkside, Unley, S.A.
1885. *Lucas, R. B., Adelaide, S.A.
1874. *Magarey, Hon. S. J., M.D., M.L.C., Adelaide, S.A.
1853. Mayo, George, F.R.C.S., Adelaide, S.A.
1874. Mayo, G. G., C.E., Adelaide, S.A.
1882. *Meyrick, E. T., B.A., Ramsbury, Hungerford, Wilts, England.
1880. Molineux, A., F.L.S., Secretary Central Agricultural Bureau South Australia, Kent Town, S.A.
1859. (L) Murray, David, Adelaide, S.A.
1884. Munton, H. S., Brighton, S.A.
1893. Perks, R. H., M.D., F.R.C.S., Eng., Medical Superintendent Adelaide Hospital, S.A.
1883. Phillips, W. H., Adelaide, S.A.
1886. Poole, W. B., Adelaide, S.A.
1882. Robertson, R., F.F.P.S., Adelaide, S.A.
1885. *Rennie, H. E., M.A., D.Sc., F.C.S., Professor of Chemistry University of Adelaide.
1891. Rogers, R. S., M.D., Adelaide, S.A.
1876. *Rutt, Walter, C.E., Adelaide, S.A.
1891. Selway, W. H., Jun., Adelaide, S.A.
1886. Scott, James L., Hyde Park, S.A.
1857. Smeaton, Thomas D., Blakiston, Little Hampton, S.A.
1871. Smith, Robert Barr, Adelaide, S.A.
1882. Smythe, J. T., B.A., B.E., Inspector of Schools South Australia, Glenelg, S.A.
1881. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Hon. Director S.A. Museum, Hon. Surgeon Adelaide Hospital, Adelaide, S.A.
1893. *Streich, Victor, Adelaide, S.A.
1876. *Tate, Ralph, F.L.S., F.G.S., Professor of Natural Science University of Adelaide.
1886. *Tepper, J. G. O., F.L.S., Entomologist S.A. Museum (Corresponding Member, 1878), Adelaide, S.A.
1856. *Todd, Sir Charles, K.C.M.G., M.A., F.R.S., F.R.A.S., Government Astronomer, Postmaster-General, and Superintendent of Telegraphs South Australia, S.A.
1889. Vardon, Joseph, J.P., Adelaide, S.A.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1883. Wainwright, E. H., B.Sc., St. Peter's College, S.A.
1878. Ware, W. L., Adelaide, S.A.
1879. Way, Edward W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, SA.
1859. Way, Samuel J., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, S.A.
1882. *Whittell, Horatio, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner Adelaide, Adelaide, S.A.
1886. Wilson, John, F.E.T.S., Goodwood, S.A.
1886. *Zietz, A., Assistant Director S.A. Museum, Adelaide, S.A.

ASSOCIATE.

1893. Birks, Laurence, Adelaide, S.A.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT

For the Year ending 30th September, 1893.

In presenting their annual report the Committee are pleased to record the successful completion of the first decade of the Section's existence.

Evening Meetings.—During the year nine evening meetings have been held, at which the average attendance has been greater than that of the previous year. It was arranged that during this session the meetings of this Section and those of the Microscopical Section should be held jointly. Both Sections, therefore, now meet on the same night, and alternately provide the chief business for the evening. This union has proved very satisfactory to both Sections, and renders the meetings of greater interest, whilst economising time and expense. The annual conversazione (held in October, 1892) was again a most successful and interesting gathering, about 130 members and friends being present, and a varied programme of a scientific and social character being provided. Papers for this Section have been contributed by Dr. R. H. Perks, F.R.C.S., Messrs. J. McEwin, A. F. Calvert, M.E., J. G. O. Tepper, F.L.S., and S. Smeaton, B.A. A considerable number of exhibits in various departments of natural history have proved not the least attractive feature of the evening meetings.

Excursions.—The outdoor meetings for the practical study of natural history continue to be appreciated by the members. In consequence of the increased interest shown in this direction at the close of last year (the first excursion after the annual meeting being attended by over forty persons) a greater number were arranged during the year just closing, ten excursions having been held, as against five in the previous year. The chief feature of these excursions has been that, notwithstanding the great number held since the inception of the Section, all those of the past year have covered new ground. The longest excursion was that to

Mount Gawler (near Kersbrook), whilst the most successful scientifically were those to Happy Valley and the scrub between Gawler and Roseworthy. Other interesting outings were those to Norton's Summit, Waverley, Marble Hill, and Blackwood. The Section is indebted to His Excellency the Governor, Messrs. A. T. Magarey, Wm. Milne, jun., and W. P. Phillips for hospitality, &c., in connection with the excursions.

Protection of our Native Fauna and Flora.—A separate report from the Committee appointed by the Section for the protection of our native fauna and flora shows that useful work is being performed, and that there is still plenty of scope for continued effort in this direction.

Corresponding Members.—Your Committee desire to express their thanks to the corresponding members, who still continue to evince an interest in the Section's work by sending contributions either of specimens or observations in natural history. Mrs. A. F. Richards, Georgetown, and Mr. W. Rumball, Blinman, have been the most energetic in this way. Your Committee would remind local correspondents that they are not registered as "corresponding members" until they show in a practical way their desire to be of use to the Section.

Publications.—Your Committee are indebted to the Field Naturalists' Club of Victoria and the trustees of the Australian Museum, Sydney, for kindly supplying the Section with their publications.

Financial.– The audited statement of accounts is presented herewith. The amount received from subscriptions has been a little less than in the previous year, but the expenditure has also been lower. The grant from the Royal Society has also been less than that of the preceding year.

Membership.—The number of new members this year has been just double that of last year. Twelve persons have been elected members of the Section, and sixteen names have been removed from the list on account of resignation and other causes. The number now on the roll is 93.

J. G. O. Tepper, Chairman.
W. H. Selway, Jun., Hon. Secretary.

Adelaide, 18th September, 1893.

FIFTH ANNUAL PROGRESS REPORT OF NATIVE FAUNA AND FLORA PROTECTION COMMITTEE.

In presenting their fifth annual report the Committee are pleased to be able to report further progress.

National Park.—The Committee have been glad to notice the

advance already made by the Commissioners at Belair. They trust that at an early date there will be sufficient funds to enable something definite to be done in connection with the preservation of native plants and animals.

Game Laws.—Thanks are again due to the Commissioner of Crown Lands and the police authorities for their assistance in securing the enforcement of the Game Acts. The Kangaroo Protection Act has proved of great service, and it is to be trusted that the prosecutions made thereunder will act as a warning to hunters. Two districts have been proclaimed under this statute, the first comprising the whole of Kangaroo Island, and the second the counties of Kintore, Hopetoun, Way, Dufferin, and Robinson on the West Coast. The charge of the Amending and Consolidating Game Bill drafted by the Committee has been kindly undertaken by the Hon. J. L. Stirling, M.L.C., and it is to be hoped that the measure, which has been very carefully considered, will before long become law.

Destruction of Native Flora.—It has been with much regret that the Committee have noticed the extensive destruction of native plants and more particularly ferns in our hills. Ferns are hawked about the city and suburbs to such a degree as to make it certain that unless prompt action be taken several of our gullies will shortly be denuded of some highly characteristic species. It seems to the Committee that this is a matter which can be to a certain extent dealt with by the various Corporations, and the City Council has been approached on the subject, with the result that the officials have been instructed to demand the production of a licence from hawkers. Other civic bodies will be written to in due course.

Australasian Association.—The Committee appointed at the Hobart meeting of this Association to report on the protection of native fauna includes Professor Tate, Mr. Dixon, and Mr. Robin. The reports which will be presented at the Adelaide gathering, to be held at the end of this month, will be of a thoroughly comprehensive character, and it is trusted will awaken a healthy interest in the question. In conclusion, the Committee hope that the future will be attended by further advance.

Samuel Dixon, Chairman.
A. F. Robin, Hon. Sec.

Adelaide, 18th September, 1893.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for the Year 1892-3.

Dr.

Receipts.	£	s.	d.
To Balance brought forward	4	5	10
" Grants from Royal Society	20	0	0
" Subscriptions	17	0	0
	£41	5	10

Cr.

Disbursements.	£	s.	d.	£	s.	d.
By Printing—"Proceedings" ...	6	2	0			
General	2	5	0			
				8	7	0
" Conversazione				4	0	6
" Postages and Sundries				3	18	0
" Advertising				2	9	0
" Attendance				1	10	0
				20	4	6
" Subscriptions, as per contra, handed over to Royal Society... ...				17	0	0
Balance in hand				4	1	4
				£41	5	10

Audited and found correct.

J. H. C. LANGDON,
THOS. EVANS, } Auditors.

Adelaide, 19th September, 1893.

W. H. SELWAY, Jun.,
Hon. Secretary and Treasurer.

MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT.

The Committee regret to still have to report that through the increasing small number of members it is very difficult to keep up an interest in the meetings of the Section. It has been found that the few members who in the past have been ever ready to contribute papers or introduce subjects for discussion are too often called upon, and when they have taken much trouble and time to work up a subject the attendance is so small as to offer little encouragement for them to continue to do so in the future.

In the early part of the year a suggestion was made by the Field Naturalists' Section that the two Sections should amalgamate, and thus secure a larger attendance at the meetings. A sub-committee was appointed to confer with a similar number from the other Section, and as a result of their report, although it was not thought desirable to altogether amalgamate the two Sections, it was decided to try having joint meetings, each taking up its own particular branch of investigation every alternate month The result has been that during the present session the meetings were much better attended, and it is hoped there has been mutual benefit from the discussion of the various papers, &c.

Three excursions have been made during the year, and were fairly attended. No new places which would reward the microscopical investigator could be found, but several new forms of pond-life were discovered.

The number of members after revision of the roll is 17, several of whom never attend the meetings. The average attendance of members during the present session has been 7.

The following were the subjects discussed at the meetings :—

1892.

Oct. 4. Demonstration on mounting opaque objects in wax cells, by Mr. E. J. Bradley.

Nov. 8. Remarks on Australian polyzoa, by Mr. W. B. Poole.

1893.

March 14. Collecting, sectioning, and mounting foraminifera, by Mr. E. J. Bradley.

May 16. Paper on external anatomy of the blowfly, illustrated by lantern slides, by Mr. W. B. Poole.

July 21. Paper on the calcareous plates of the Holuthurian, illustrated by lantern slides, by Mr. J. W. Bussell.

D. Fleming, Chairman.
J. W. Bussell, Hon. Sec.

September 19th, 1893.

MICROSCOPICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR YEAR ENDING 30TH SEPTEMBER, 1893.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
To Subscriptions received	5	0	0	By Cash due to Secretary	0	1	0
" Grant from Royal Society for 1892	5	10	0	" Printing Reports	1	2	6
" Grant from Royal Society for 1893	5	0	0	" Magazines	1	2	6
				" Binding Magazines	0	18	0
				" Postcards and Printing same	0	14	0
				" Postage, &c.	0	7	7
				" Attendance and Kerosene	1	10	0
				" Subscriptions paid Royal Society	5	0	0
				" Balance in hand	4	14	5
	£15	10	0		£15	10	0

Audited and found correct.

C. C. PRESGRAVE, Auditor.

September 19th, 1893.

D. FLEMING, Chairman.

J. W. BUSSELL, Hon. Secretary.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

FIRST ANNUAL REPORT.

In presenting their first report the Committee of the Astronomical Section desire to congratulate their fellow-members upon the successful establishment of the society, which from the satisfactory nature of the meetings held appears to have fully justified its formation.

The existence of the society dates from the 5th April, 1892, when the first general meeting was held at the Observatory, and the following officers were elected:—C. Todd, Esq., C.M.G., M.A., F.R.S., &c., Government Astronomer, President; Messrs. W. Holden and W. Russell, Vice-Presidents; Mr. W. E. Cheesman, Secretary; Messrs. A. W. Dobbie, C. H. Harris, and Capt. Lee, members of Committee. [*Note.*—The foregoing was inserted by resolution at the annual meeting, 12th September.—W. E. Cheesman, Hon. Sec., &c.] A preliminary meeting had been held during the previous February at which 20 names were given in for membership.

The inaugural address was delivered by the President at a well-attended meeting on 14th June, 1892, since which time various papers have been given at intervals of two months by the following members:—

Construction of the reflecting telescope, by Mr. Dobbie.
Irradiation as it affects astronomical observations, by Captain Lee.
What is a comet? by Mr. Cooke.
A visit to the Royal Observatories of Greenwich and the Cape of Good Hope, by Mr. Sells.
Theory of the tides, by Mr. Kelly.
Photogrammetry, by Mr. Harris.

Abstracts of these have appeared in the daily papers.

At a Committee meeting, held on March 7th this year, the draft report and balance-sheet were submitted, and held over, pending a proposed alteration in the date of the annual meeting,

rendered necessary by the rules of the Royal Society, which require reports of Sections to be furnished on or before the 15th September in each year. This action was confirmed at the next general meeting, and the date of the annual meeting was fixed for the second Tuesday in September.

A "systematic scrutiny of the sky, for new and temporary stars," has been instituted, and our members may now feel that they are colaborating with astronomers the world over. A large chart embracing part of the Milky Way has been carefully compiled by Mr. Sells and subdivided into 33 sections, which have been allotted to members willing to keep a watch upon a small portion of the sky represented in the chart supplied to them, and to report any change or unusual appearance they may notice to the Government Astronomer.

The objects of the Section as set forth in Rule 2, viz., "The cultivation of a knowledge of the science of astronomy, and the encouragement of a popular interest in the same," are, we believe, being effectually carried out. The monthly publication of astronomical notes and their regular distribution to all members has helped very much to sustain public interest in our work.

Adopted at meeting held 12th September, 1893.

CHARLES TODD, President.
W. E. CHEESMAN, Secretary and Hon. Treasurer.

ASTRONOMICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Statement of Receipts and Expenditure to 15th September, 1893.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Grant from Royal Society	10	0	0	By Advertisements	1	1	0
" Subscriptions, 1892	7	0	0	" Postage	3	18	0
" Subscriptions, 1893	4	15	0	" Stationery	0	15	4
" Messrs. Sells & Farr—Advertisements ...	1	1	0	" Printing Astronomical Notes	3	0	0
" Mr. Holden—Printing	0	4	0	" Printing Rules, &c.	0	5	3
" Interest, Savings Bank	0	3	8	" Ballot Box, &c.	1	0	6
					10	0	11
				" Subscriptions paid to Royal Society	7	0	0
				" Balance in Savings Bank	4	3	8
				" Balance in hand	1	19	1
	£23	3	8		£23	3	8

Audited and found correct.

E. P. SELLS, Auditor.

Submitted to the Annual Meeting, held 12th September, 1893.

September 8th, 1893.

W. E. CHEESMAN, Hon. Secretary and Treasurer.

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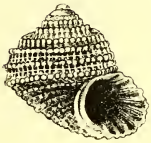

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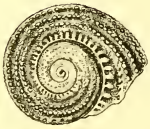

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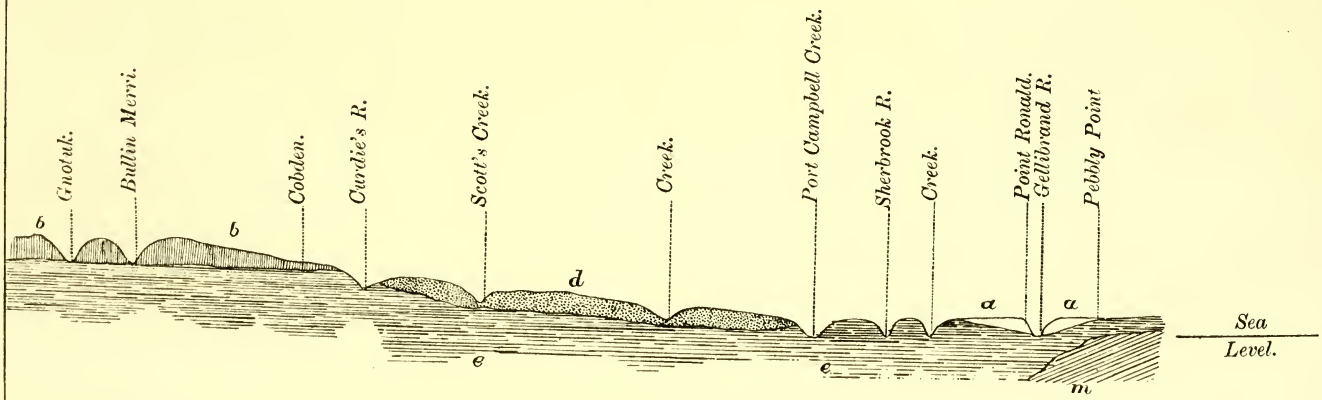
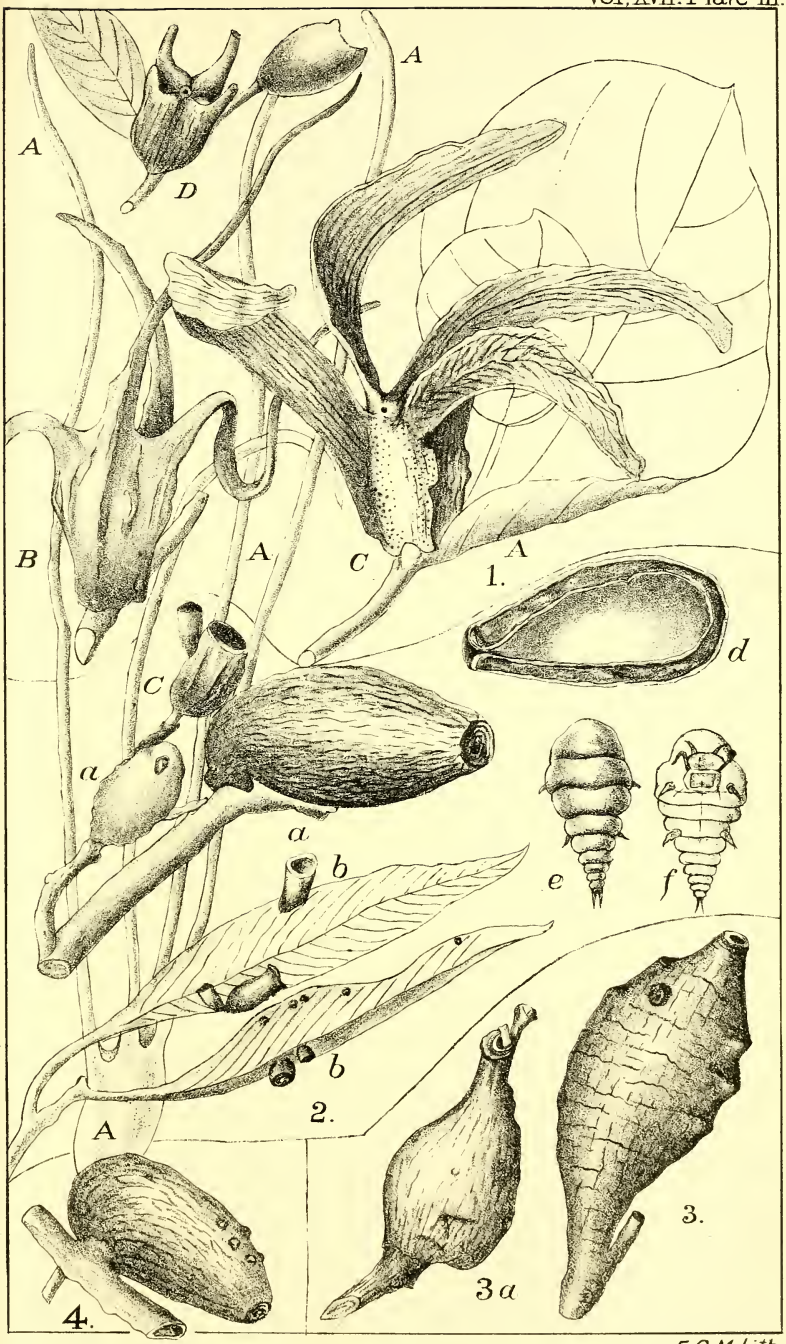
Diagram Section from Pebbly Point to Lake Gnotuk.

Approximate Horizontal Scale, 1 inch to 8 miles.



a. Æolian Limestone. b. Basalt. d. Drift. e. Eocene. m. Mesozoic.



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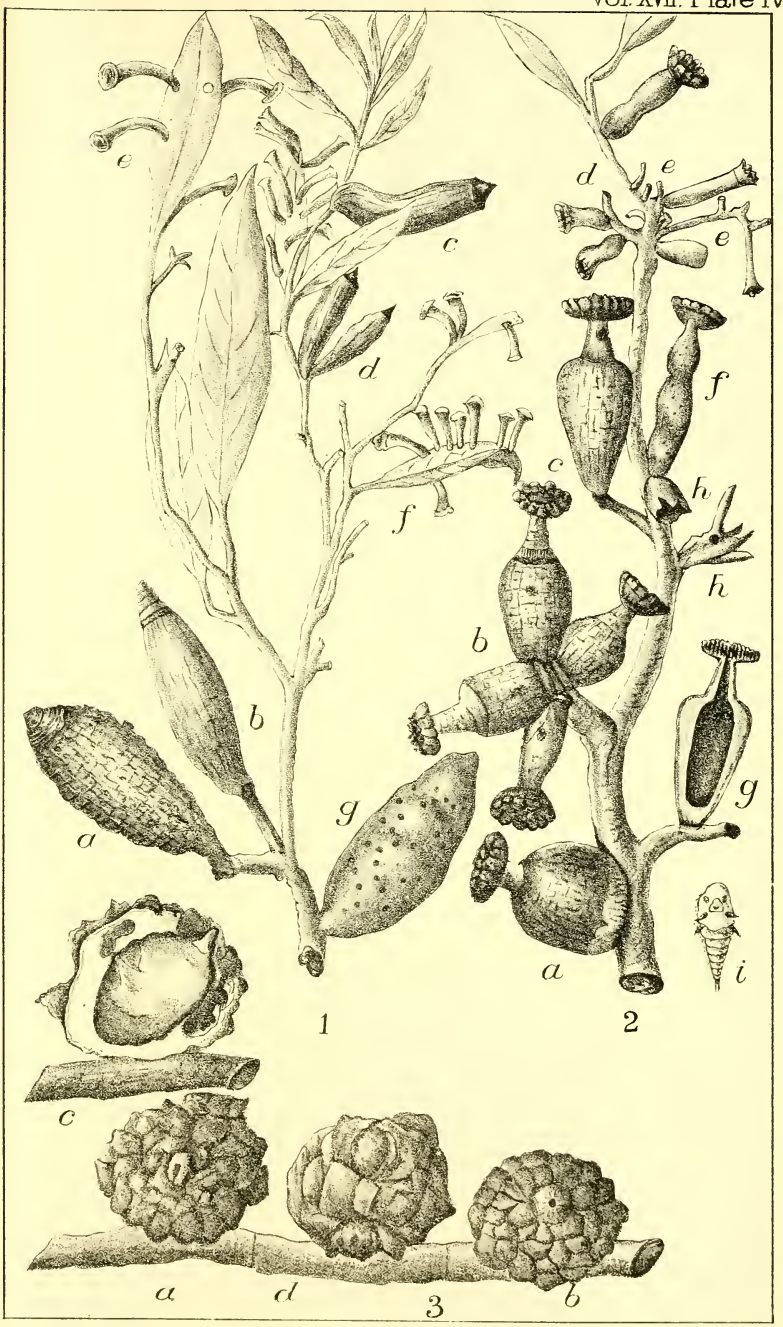

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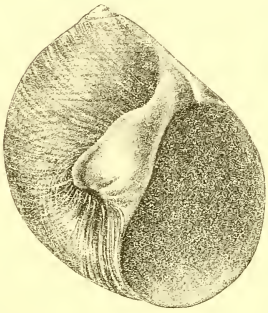

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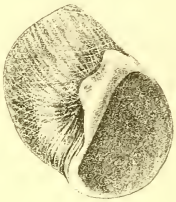

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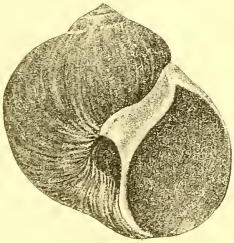

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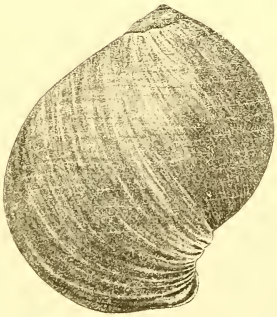

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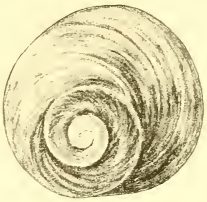

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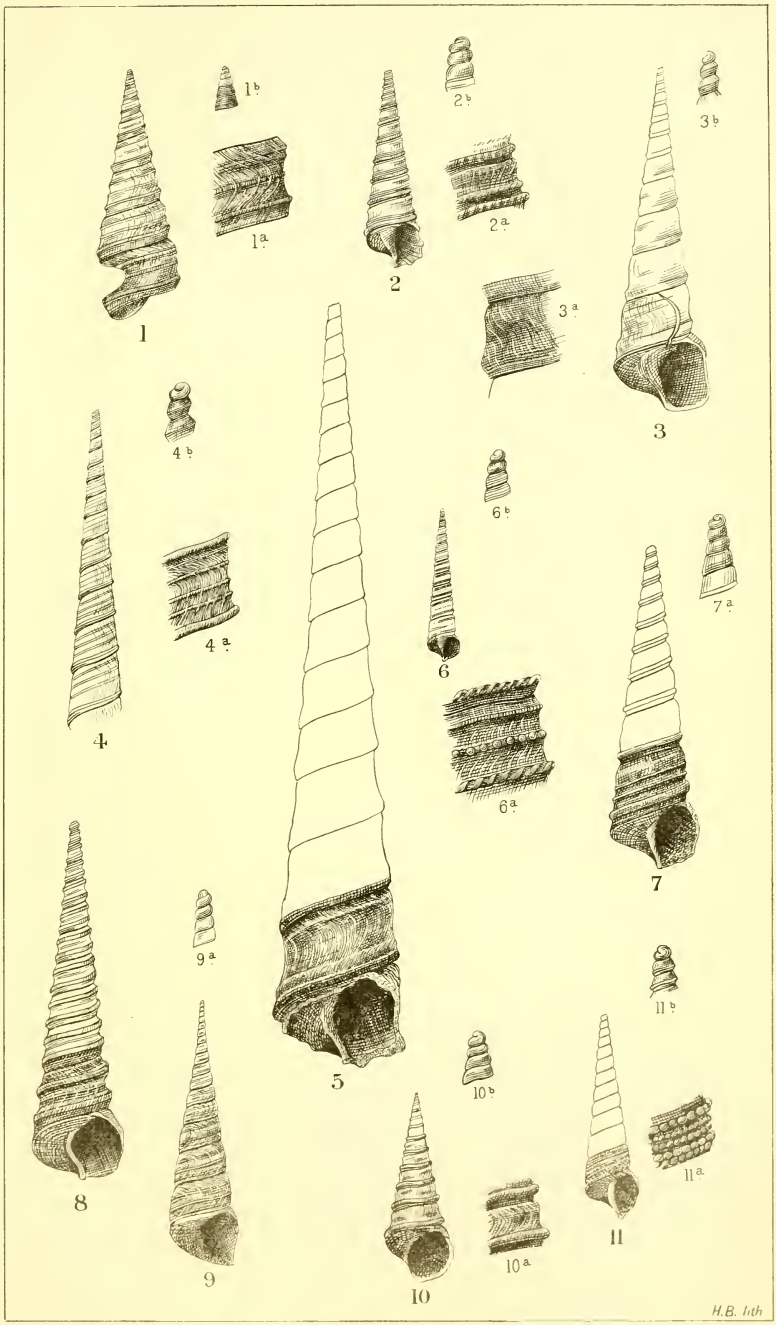
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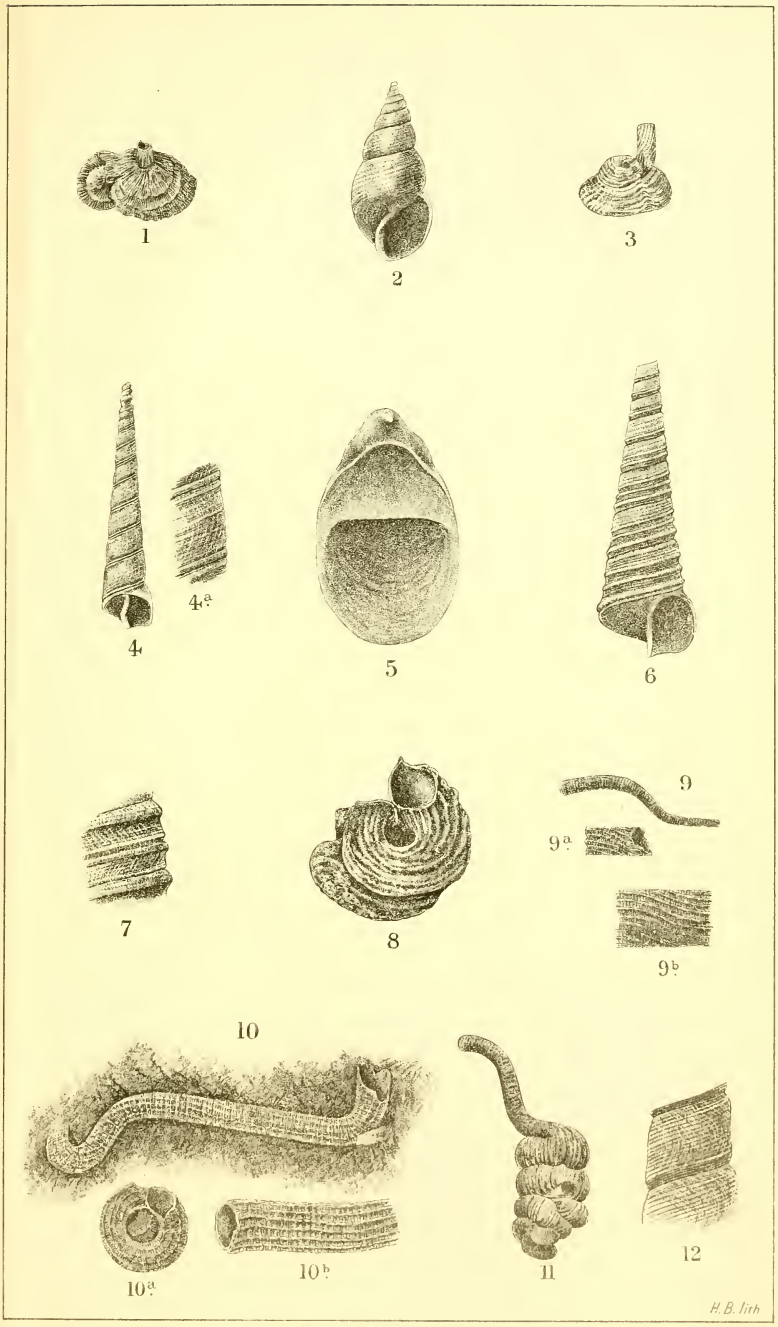
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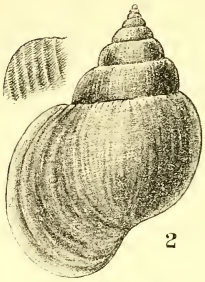

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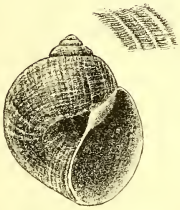

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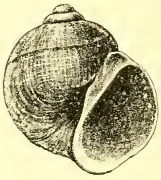

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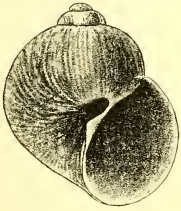

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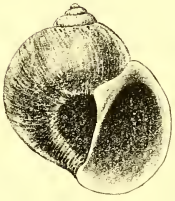

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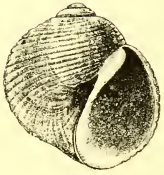

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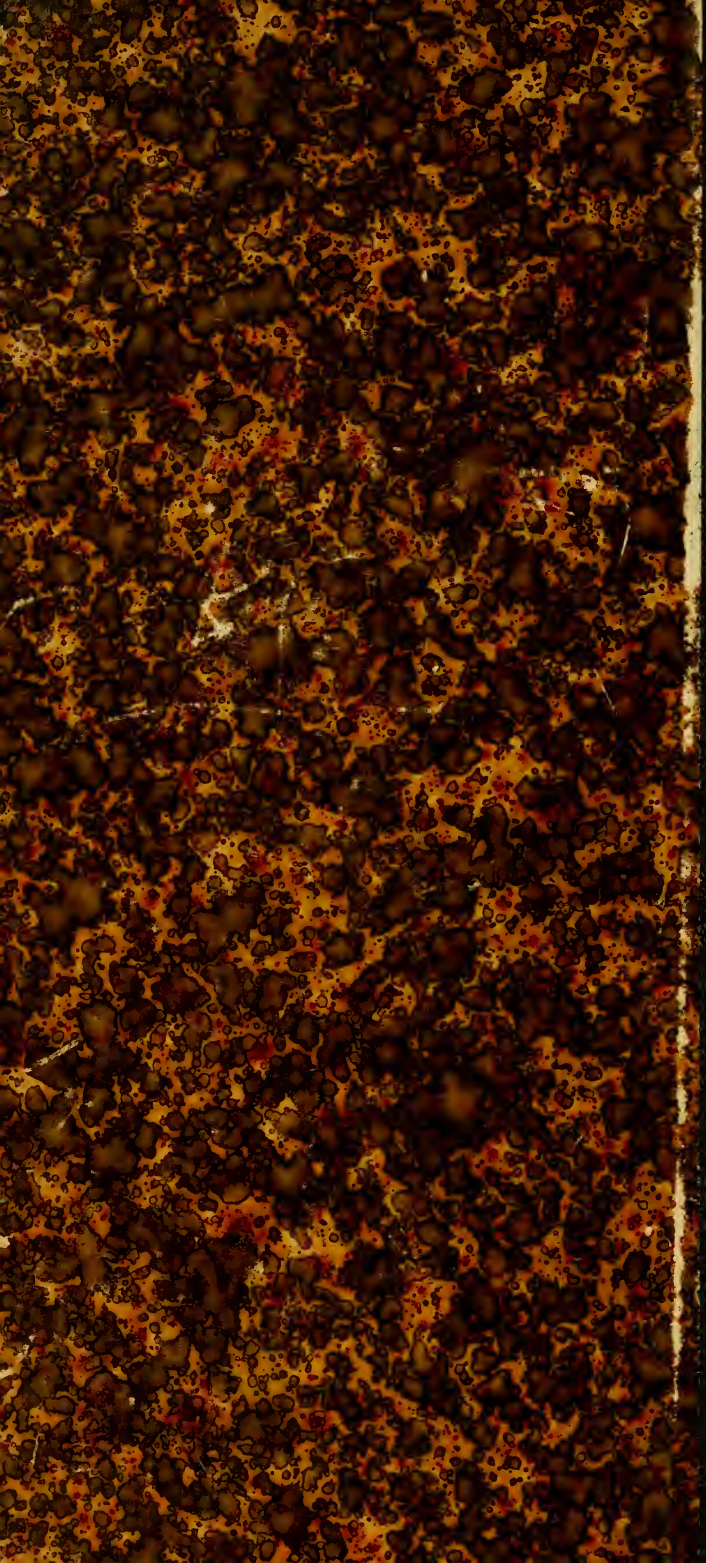
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